CHAPTER - VI

ANALYSIS OF FUNCTIONAL STRATEGIES

Chapter-6 deals with key functional strategies of the select Biomass Power Plants under study focusing on various salient features/components of such strategies with a view to know whether they have any impact on the performance of the plants. It may be noted that all organizations, irrespective of their nature and scope of business, must perform the functions such as production, marketing, finance, human resource management, etc. Careful planning, execution and coordination of these functional activities are highly essential for effective performance of Biomass power plants. Each functional area has to integrate its activities not only with the overall goals and objectives of the organization, but also with other functional strategies so as to ensure the overall performance of the biomass power plants.

Functional-level strategy, according to Gareth R. Jones (2002), is "a plan of action to strengthen an organization's functional resources, as well as its coordination abilities, in order to create core competencies". Pearce and Robinson (2004) define functional strategy as "a short term game plan for a key functional area". It is evident from the strategic management literature that functional strategies are concerned with developing and nurturing distinctive competencies in the respective functional area to provide a business unit with competitive advantage. Just as a multi-divisional corporation has several business units, each with its own business strategy, each business unit has its own set of functional strategies to identify and undertake activities unique to the function. "Functional strategies thus build a bridge between the overall direction of the organization and the current status of that function".

It is through key functional strategies that managers can implement short-term objectives, add value to the organization and provide competitive advantage through each of the functional areas. A business unit that tries to gain competitive advantage through effective production activities will require an effective production strategy that emphasizes on capacity utilization, quality, prudent production processes, etc. A business

unit that emphasizes hiring and training of a highly skilled workforce requires an effective HR strategy and a business unit that emphasizes extensive interaction with the customers, brand loyalty, etc., needs an effective marketing strategy.

According to Glueck and Jauch (1984**)**, functional strategies are needed: (i) to specify more precisely how strategic decisions are implemented in each functional area, (ii) to provide a basis for controlling activities in different functional areas, (iii) to handle similar situations occurring in different functional areas in a consistent manner, (iv) to coordinate across different functions, and (v) to create distinctive capabilities in each functional area to help achieve competitive advantage.

6.1 FUNCTIONAL STRATEGIES OF BIOMASS POWER PLANTS

Discussions with the promoters and executives of Biomass power plants revealed that all the six biomass power plants under study have formulated functional strategies for each of their key business functions.

The present study analyzes the salient features and components of key functional strategies of select Biomass power plants under study and also examines their impact on the performance of the said biomass power plants. With this objective in view, therefore, the functional strategies of biomass power plants viz., i) Production strategy ii) Marketing strategy iii) Financial strategy, iv) Human Resource strategy v) Technology strategy and vi) Logistic strategy are analyzed. The salient features of the above strategies are briefly examined below and their components are analyzed based on the opinions gathered from the respondents and also interaction with the concerned executives of the functional area. Each of these strategies further comprise of different sub-areas or elements. The perceptions of the respondents on each of the elements were captured and presented in appropriate tables and exhibits to analyze the emphasis given to them in Biomass power plants. For this purpose, a five-point scale was used with a set of choice alternatives viz., “very strong emphasis”, “strong emphasis”, “moderate emphasis”, “low emphasis” and “no emphasis”. It is needless to say that their place in the list indicates their priority; for

example, “very strong emphasis”, represents the highest priority and “strong emphasis”, the next highest, and “low emphasis” and “no emphasis” indicate the lowest priority while “moderate emphasis” indicates the middle level priority. These labels are used to understand the emphasis given to various elements of functional strategies. The frequencies of responses are taken and plotted on a pie-chart. The one with the highest frequency is understood as carrying the most dominant place in the functional strategy concerned. This chapter also examines the correlation and regression between various strategies and other variables, the need for adoption of additional strategies and also the strategic imperatives that need to be rigorously pursued for successful operation of biomass power plants.

6.1.1 PRODUCTION STRATEGY

Production or operations management is the core function of any organization. This function converts inputs (raw materials and skills) into value enhanced output. Production strategy plays a crucial role in shaping the ultimate success of a firm. It enables an organization to make optimal decisions regarding production capacity to be achieved, efficient raw material utilization, inventory planning, maintenance of existing facilities, etc. Constant review of production plan aids in maintaining proper balance of capital investment in plant, equipment and inventory, personnel commitment, efficient operation of the production system. The Biomass power plants under study have formulated a comprehensive production strategy consisting of all the essential elements. Some of the salient features of the production strategy of biomass power plants are examined below under the heads production scheduling, capacity utilization, plant maintenance, efficiency of raw material utilization, inventory management, material handling, waste control, etc.

i) Production Scheduling

To achieve the economies of scale and minimize the down-time, a prudent exercise of production scheduling is of utmost importance to the Biomass power plants. Further, production scheduling ensures effective utilization of manpower and timely supply of raw material to the plant. In view of these considerations, production scheduling cannot

be left to haphazard operations. The study intends to fathom the views of the respondents on production strategy are presented in Table No. 6.1 and Exhibit 6.1 below:

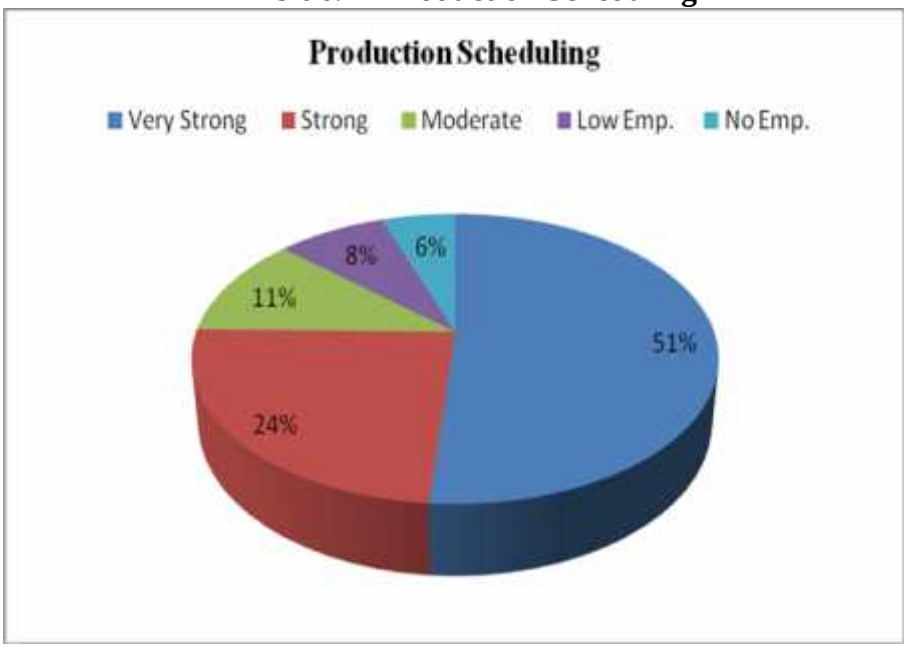
Table 6.1 and Exhibit 6.1 reveal that 77 respondents representing 51.3 per cent gave production scheduling 'very strong emphasis' and 36 respondents representing 24 per cent 'strong emphasis'. The results also reveal that 11.3 per cent of the respondents opted 'moderate emphasis' while 8 per cent 'low emphasis', and 5.4 per cent 'no emphasis' respectively.

Table 6.1 - Production Scheduling

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	77	51.3	51.3	51.3
Strong	36	24	24	75.3
Moderate	17	11.3	11.3	86.6
Low Emp.	12	8	8	94.6
No Emp.	8	5.4	5.4	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.1 - Production Scheduling



Quite expectedly, a majority of the respondents accorded high priority to production scheduling in the Production Strategy adopted by biomass power plants as the objective

of this strategy is to maximize the efficiency of operations of the plant and reduce overall costs.

ii) Capacity utilization

The investment made in capacity building is a sunk cost which has to be leveraged by most effective utilization of the capacity. In the absence of full utilization of capacity, depreciation cuts into the profit margin of the plant. It goes without saying that when capacity is fully utilized, not only the suppliers of raw material but also every functionary of the plant are highly satisfied with its operations. Considering the importance of this element of production strategy, the study attempted to elicit the views of the respondents on the emphasis given by biomass power plants.

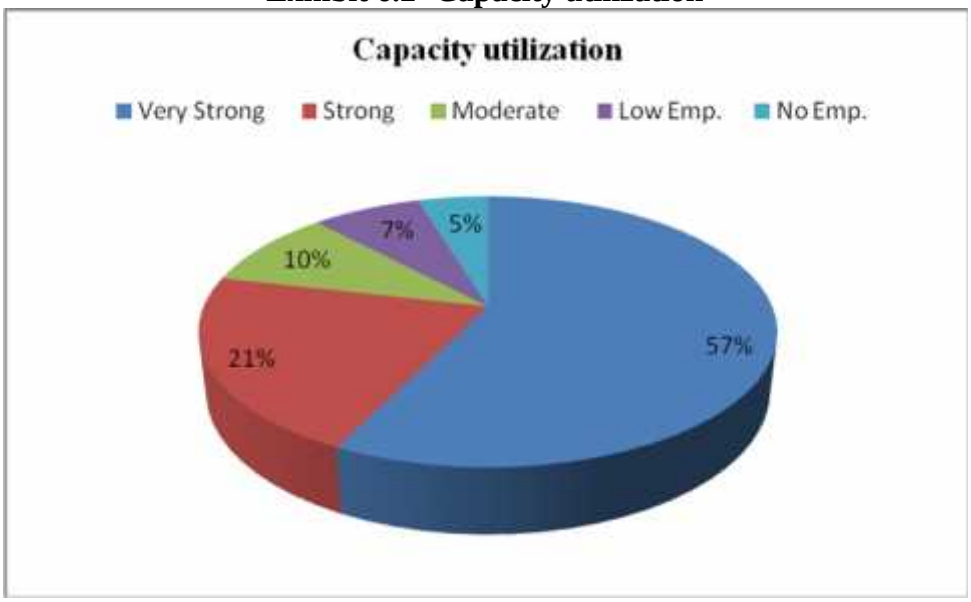
The results of the analysis are presented in Table 6.2 and Exhibit 6.2 which depict that as many as 86 respondents representing 57.3 per cent agreed that capacity utilization was given "very strong emphasis" and 32 respondents representing 21.3 per cent was given "strong emphasis". The analysis also reveals that 9.4 per cent of the respondents gave "moderate emphasis", 7.3 per cent "low emphasis", and 4.7 per cent "no emphasis" respectively. On the basis of the above analysis it can be inferred that capacity utilization was given due importance in the Production Strategy adopted by Biomass power plants as it helps to maximize generation of power leading to increase in revenues.

Table 6.2 - Capacity utilization

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	86	57.3	57.3	57.3
Strong	32	21.3	21.3	78.6
Moderate	14	9.4	9.4	88.0
Low Emp.	11	7.3	7.3	95.3
No Emp.	7	4.7	4.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.2- Capacity utilization



iii) Efficiency of Raw Material Utilization

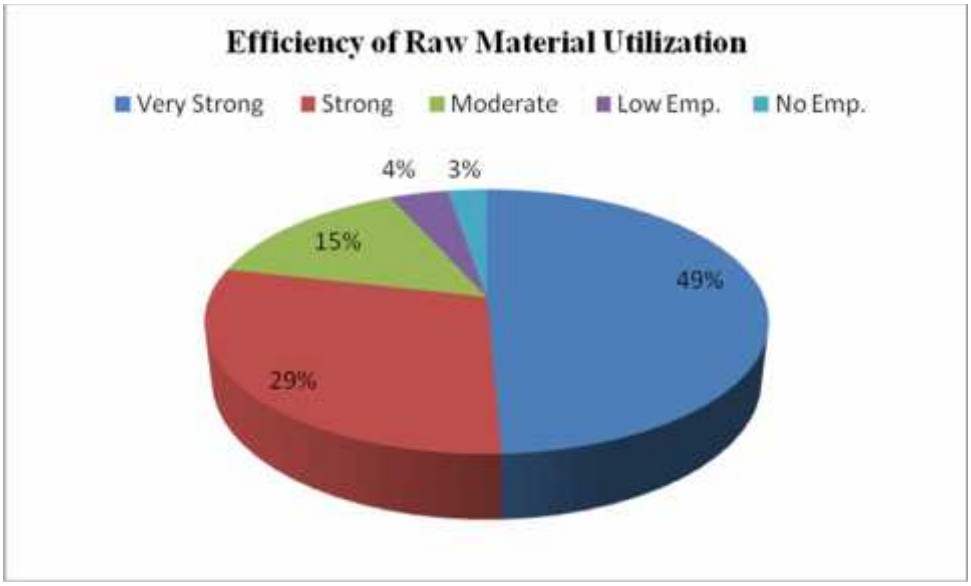
Raw material that comes in and the manner it is put to use is a source of value. Ensuring timely availability of raw material, its proximity to the point of use, wastage reduction, etc., prevent downtime and stock-outs and significantly help in efficient operation of the plant. It is very important to note that while issuing the raw material to the boiler, the 'First - In – First – Out' (FIFO) method is followed so that the bio-degradation of raw material can be minimized. Having understood its importance, it is attempted to study the emphasis given to efficiency of raw material utilization. The views of the respondents are presented in Table 6.3 and Exhibit 6.3.

Table 6.3 - Efficiency of Raw Material Utilization

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	74	49.3	49.3	49.3
Strong	44	29.3	29.3	78.6
Moderate	22	14.7	14.7	93.3
Low Emp.	6	4.0	4.0	97.3
No Emp.	4	2.7	2.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.3 - Efficient Raw Material Utilization



The analysis shows that 74 respondents representing 49.3 per cent agreed that efficient utilization of raw material was given 'very strong emphasis', 29.3 per cent 'strong emphasis', 14.7 per cent 'moderate emphasis', 4.0 per cent 'low emphasis', and 2.7 per cent 'no emphasis' respectively. From the above analysis, it can be concluded that efficiency of raw material utilization was given high priority in the Production Strategy adopted in Biomass power plants as it is very important to reduce the cost of power generation.

iv) Plant Layout

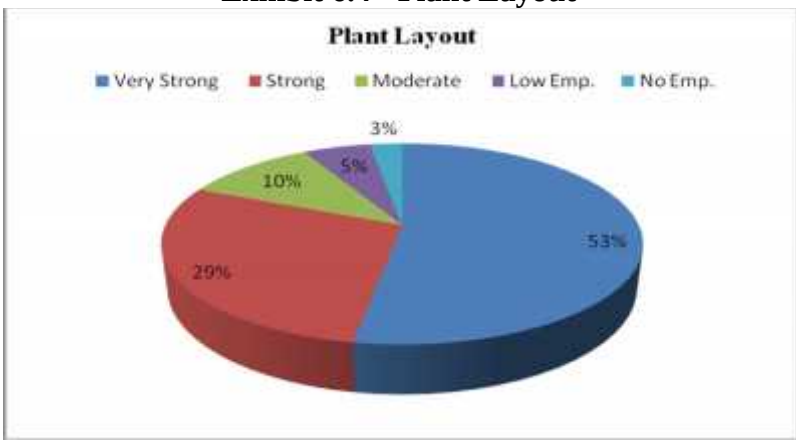
The layout of a plant is highly helpful for raw material accessibility, efficient flow of throughput and efficient utilization of manpower. Inconvenient plant layout entails a permanent handicap affecting every operation and every functionary of the plant. Driven by this awareness, it is attempted to find out what priority is given to the plant layout in the Production Strategy. The views of the respondents on this element of Production Strategy is presented in Table 6.4. and Exhibit 6.4.

Table 6.4 - Plant Layout

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	79	52.7	52.7	52.7
Strong	43	28.7	28.7	81.4
Moderate	16	10.6	10.6	92
Low Emp.	8	5.4	5.4	97.4
No Emp.	4	2.6	2.6	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.4 - Plant Layout



The results of the analysis reveal that 79 respondents representing 52.7 per cent expressed 'very strong emphasis' and 28.7 per cent 'strong emphasis' on the plant layout. The analysis also reveals that 10.6 per cent of the respondents expressed 'moderate emphasis', 5.4 per cent 'low emphasis', and 2.6 per cent 'no emphasis' respectively. It can be inferred from the above analysis that plant layout was given high importance in the Production Strategy of Biomass power plants as it helps optimum arrangement of facilities, equipment, storage, and other supporting services for better functioning of the plant.

v. Material Handling

Material handling system is a process which guides the movement, storage, protection and control of raw materials and consumables throughout the process of manufacturing, warehousing, distribution, consumption and disposal. This system also supports the

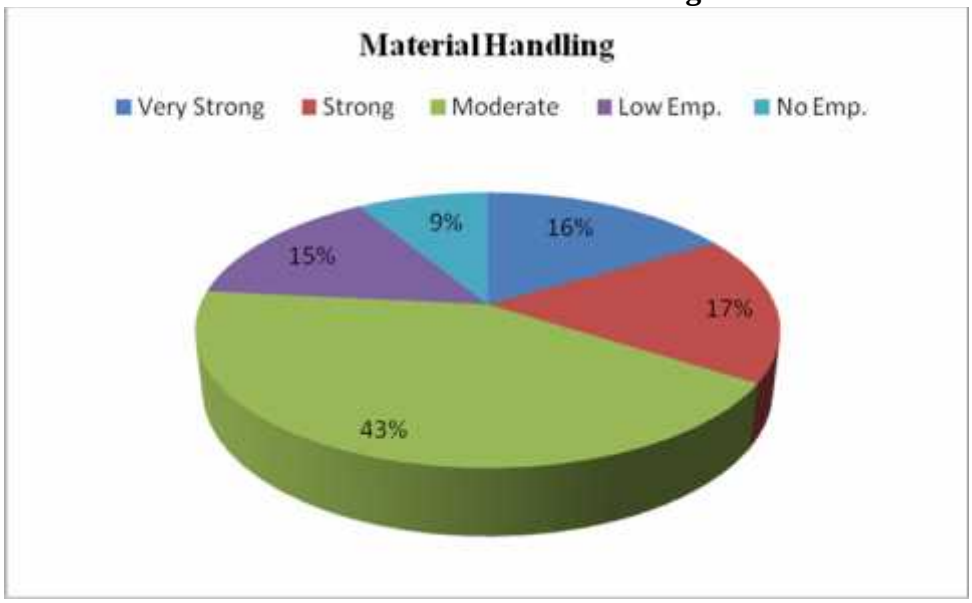
logistics and makes the supply chain work effectively. Ineffective material handling results in biodegradation of raw material, wastage, and ineffective utilization of the workforce and adversely impacts the overall cost of production. The results of the analysis are shown in Table 6.5 and Exhibit 6.5.

Table 6.5 - Material Handling

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	25	16.6	16.6	16.6
Strong	26	17.4	17.4	34.0
Moderate	64	42.6	42.6	76.6
Low Emp.	22	14.7	14.7	91.3
No Emp.	13	8.7	8.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.5 - Material Handling



The above analysis reveals that 64 respondents representing 42.6 per cent laid only 'moderate emphasis', while 26 respondents representing 17.4 per cent 'strong emphasis'. 25 respondents representing 16.6 per cent 'very strong emphasis', 14.7 per cent 'low emphasis', and 8.7 per cent 'no emphasis' respectively. On the basis of the data analysis presented in the above Table inference may be drawn that the material handling system

which is essential for solving the problems involved in the movement, storage, and protection of materials throughout the power generation process has been accorded only moderate or low priority in Biomass power plants.

vi. Waste Control

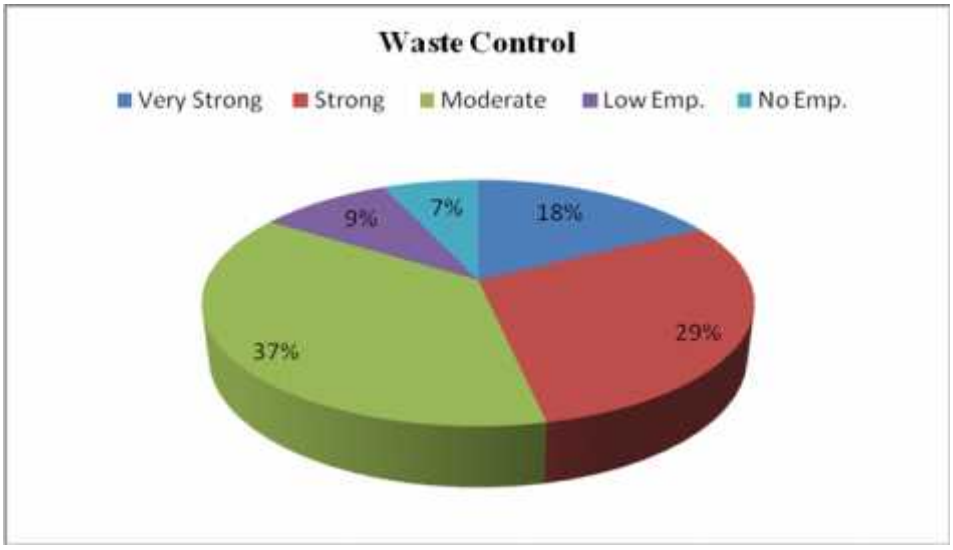
It should be noted that biomass power industry itself is mainly dependent on agriculture and forest wastes. Minimization of wastage is very much essential for Biomass power plants as it saves the cost of production to a significant extent. The results of the analysis as shown in Table 6.6 and Exhibit 6.6 reveal that 56 respondents representing 37.3 per cent placed only 'moderate emphasis' while 29.3 per cent placed 'strong emphasis' on the waste control system in the biomass power plants. The analysis also reveals that only 26 respondents representing 17.4 per cent laid 'very strong emphasis', 9.3 per cent 'low emphasis', and 6.7 per cent 'no emphasis' respectively. It can be inferred that in the case of Biomass power plants under study waste control was given moderate or low priority in the Production Strategy.

Table 6.6 - Waste Controls

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	26	17.4	17.4	17.4
Strong	44	29.3	29.3	46.7
Moderate	56	37.3	37.3	83.0
Low Emp.	14	9.3	9.3	92.3
No Emp.	10	6.7	6.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.6 - Waste Control



vii. Plant Maintenance

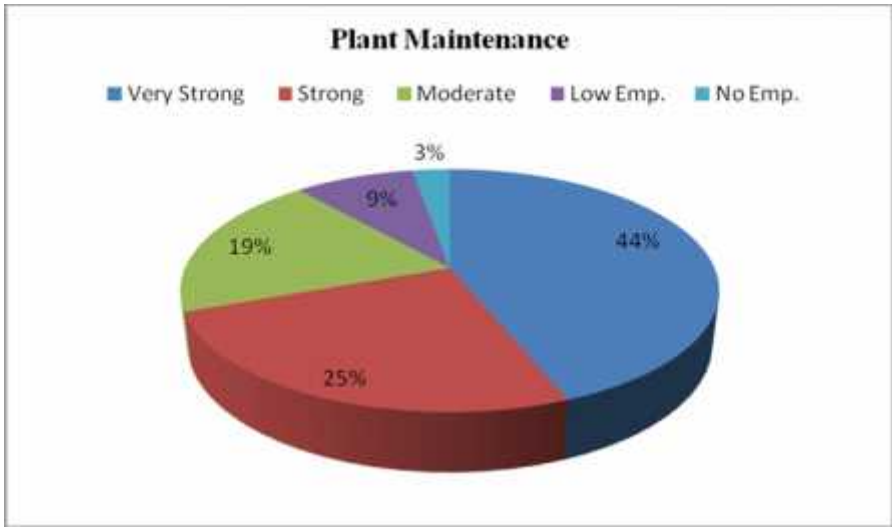
Plant maintenance involves the regular upkeep of the machinery so that its functioning is smooth and down-time is minimized. It also eliminates the frequent restart of the plant which involves avoidable costs every time the plant is restarted while maintaining the station heat rate. The results of the analysis are shown in Table 6.7 and Exhibit 6.7 which reveal that 44.0 per cent of the respondents placed 'very strong emphasis', 25.3 per cent 'strong emphasis', 19.4 per cent 'moderate emphasis', 8.6 per cent 'low emphasis', and 2.7 per cent 'no emphasis' respectively on this aspect. It can be inferred from the above analysis that plant maintenance was given due importance in Biomass power plants since it helps in effective utilization of the plant facilities and reduction of idle time.

Table 6.7 - Plant Maintenance

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	66	44.0	44.0	44.0
Strong	38	25.3	25.3	69.3
Moderate	29	19.4	19.4	88.7
Low Emp.	13	8.6	8.6	97.3
No Emp.	4	2.7	2.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.7 - Plant Maintenance



viii) Inventory planning

Inventory planning is very important since even a negligible percentage of reduction in inventory costs has the potential to substantially reduce the overall cost of production. The results of the analysis as shown in Table 6.8 and Exhibit 6.8 reveal that 76 respondents representing 50.6 per cent placed 'very strong emphasis' and 32 respondents representing 21.4 per cent 'strong emphasis'. The analysis also reveals that 22 respondents representing 14.7 per cent placed 'moderate emphasis', 10.6 per cent 'low emphasis', and 2.7 per cent 'no emphasis' respectively on inventory planning. From the above analysis, it can be inferred that inventory planning in Biomass power plants was given due importance in the Production Strategy since inventory planning in Biomass power plants helps to adjust optimal quantity and timing of inventory for the purpose of aligning with the production capacity.

Table 6.8 - Inventory planning

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	76	50.6	50.6	50.6
Strong	32	21.4	21.4	72.0
Moderate	22	14.7	14.7	86.7
Low Emp.	16	10.6	10.6	97.3
No Emp.	4	2.7	2.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.8 - Inventory planning

6.1.2 MARKETING STRATEGY

Marketing is one of the critical functions of any business enterprise because the overall corporate success hinges on how effectively the products of the firm are sold in the market. It identifies customer needs, determines target markets, and designs appropriate products, services and programmes to serve these markets. Marketing management provides vital means to interact with customers, competitors, and society at large and to influence the outcome of business operations. Business organizations are increasingly becoming market-oriented and all the business activities in the enterprise are directed towards customer satisfaction. Planning in the marketing area is the crux of strategic

planning process in most of the organizations, and "corporate success" has generally become synonymous with marketing success. In so far as the biomass power plants under study are concerned, the sole customer is the government which purchases the total power produced by these plants. Therefore, two important aspects that need to be studied in the marketing strategy of Biomass power plants relate to the distribution system and the marketing information system.

i. Distribution System

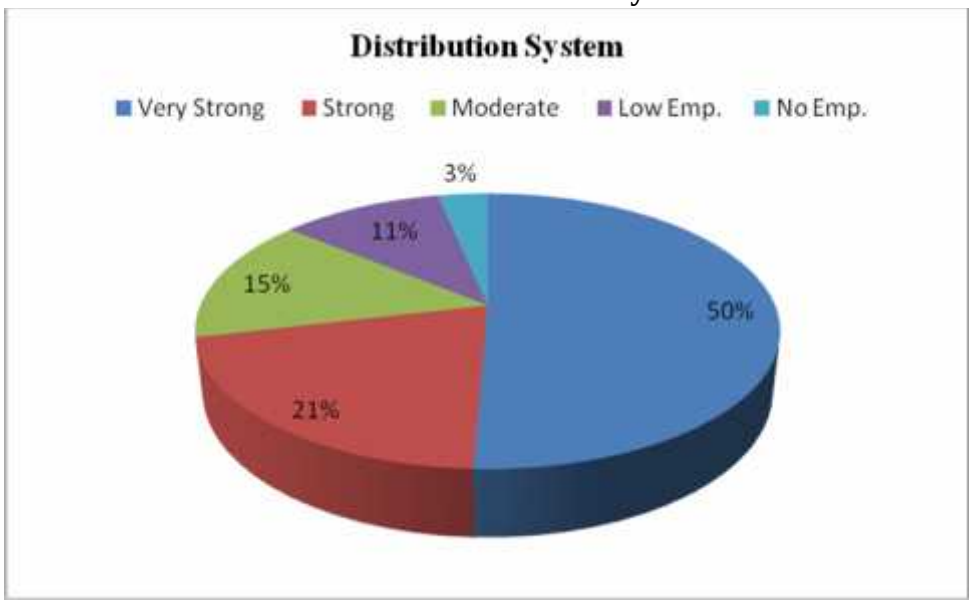
The outflow of the generated power should immediately reach the grid so that transmission loss is minimized. Setting up of a proper distribution system can help to reduce transmission losses. The results of the analysis as shown in Table 6.9 and Exhibit 6.9 reveal that 76 respondents representing 50.7 per cent have placed 'very strong emphasis', 20.7 per cent 'strong emphasis', 14.7 per cent 'moderate emphasis', 10.7 per cent 'low emphasis', and 3.3 per cent 'no emphasis' respectively on this aspect. From the above analysis, it can be inferred that effective distribution system was given due priority in the Marketing Strategy of Biomass power plants, since it facilitates minimizing transmission losses.

Table 6.9 - Distribution System

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	76	50.7	50.7	50.7
Strong	31	20.7	20.7	71.4
Moderate	22	14.7	14.7	86.0
Low Emp.	16	10.7	10.7	96.6
No Emp.	5	3.3	3.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.9 - Distribution System



ii. **Marketing Information System**

Market information is essential for any organization to formulate strategies for production, sales and face competition from rival units. Hence it is used as a tool to take decisions and formulate strategies for overall improvement of internal operations, increasing the market share and profitability. Therefore, every organization needs to develop its own marketing information system. Keeping this in view, an attempt was made to know the marketing information system that is in existence in biomass power plants. It is observed that most of the units under study have developed their own marketing information system to obtain latest information on government policies, information from the middlemen about the availability and quality of various raw materials, cost, transportation facility, etc., for effective procurement of the material. Further all the units under study have enrolled themselves as members in Biomass Power Developers Association wherefrom they get latest information on biomass power industry, government policies, etc., which help them to protect their common interests and promote their business.

Table 6.10 and Exhibit 6.10 show an overall view of the emphasis given to the marketing information system in biomass power plant. As it can be seen from the analysis, 62

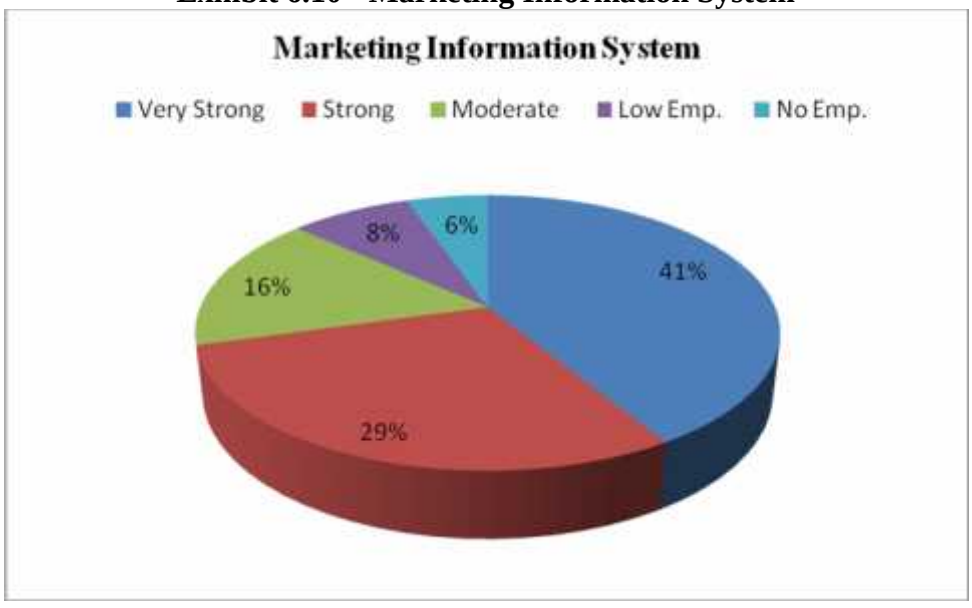
respondents representing 41.3 per cent strongly felt that the marketing information system was given “very strong emphasis” whereas 44 respondents representing a little over 29 per cent gave “strong emphasis” to the system. Further, the analysis reveals that 16.0 per cent of the respondents gave “moderate emphasis” whereas the remaining respondents gave “low emphasis” and “no emphasis” respectively. From the above analysis, it can be inferred that marketing information system was given adequate importance in Marketing Strategy adopted by Biomass power plants as it helps them to take timely decisions and formulate appropriate strategies to achieve desired results.

Table 6.10 - Marketing Information System

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	62	41.3	41.3	41.3
Strong	44	29.3	29.3	70.6
Moderate	24	16.0	16.0	86.6
Low Emp.	12	8.0	8.0	94.6
No Emp.	8	5.4	5.4	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.10 - Marketing Information System



6.1.3 FINANCIAL STRATEGY

The financial aspects of strategic planning deserve special emphasis because they are intimately connected with everything that takes place in a business enterprise. Sometimes, a carefully crafted and potentially viable strategy may have to be shelved because of paucity of funds. Although financial strategy may seem to be the last link in the planning chain, it is the backbone of strategic planning system. It provides the basic framework within which all types of strategies – corporate, business and functional strategies – are developed. It also serves as an integrating element in the strategic planning system of Biomass power plants as the very survival of the plants crucially depends on their financial health and the prudent strategies adopted by it to manage the finances.

The Biomass power plants under study have formulated a comprehensive Financial Strategy covering several strategic aspects like capital expenditure planning, working capital and cash flow planning, identification of resources, acquisition and allocation of funds, profit planning, taxation planning, etc., which have impact on the long term sustainability of Biomass power plants.

i. **Capital Expenditure Planning**

Most companies fail owing to poor financial planning, particularly, in procuring fixed capital and working capital at the most economical rates, and putting them to the most judicious use. Among the areas of financial planning, capital expenditure planning is of foremost importance. Proper capital expenditure planning ensures an ideal mix of debt and equity so that there is a proper leverage from the capital structure of the Biomass power plants. The study makes an attempt to know what kind of importance was given to capital expenditure planning in the Financial Strategy of biomass power plants. The results of the analysis as shown in Table 6.11 and Exhibit 6.11 reveal that 72 respondents representing 48.0 per cent laid ‘very strong emphasis’, 21.3 per cent ‘strong emphasis’, 12.0 per cent ‘moderate emphasis’, 10.7 per cent ‘low emphasis’, and 8.0 per cent ‘no emphasis’ respectively on capital expenditure planning. It may be inferred from the

above analysis that capital expenditure planning was given high importance in the Financial Strategy of Biomass power plants.

Table 6.11- Capital Expenditure Planning

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	72	48.0	48.0	48.0
Strong	32	21.3	21.3	69.3
Moderate	18	12.0	12.0	81.3
Low Emp.	16	10.7	10.7	92.0
No Emp.	12	8.0	8.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.11 - Capital Expenditure Planning

ii. Working Capital Planning

Working capital is required for day-to-day operations of the plant to meet the expenditure for raw material, consumables, salaries, etc. The quantum of working capital should be at its optimum level so that neither stock-outs nor high costs of storing the material result in. Realizing the importance of working capital planning, techniques like Just-In-Time (JIT) stocks are employed in Biomass power plants so that there is no unnecessary expenditure

on inventory. The results of the analysis are presented in Table 6.12 and Exhibit 6.12 which show that 56 respondents representing 37.3 per cent placed 'very strong emphasis', 32.0 per cent 'strong emphasis', 14.7 per cent 'moderate emphasis', 8.7 per cent 'low emphasis', and 7.3 per cent 'no emphasis' respectively on this. From the above analysis it can be inferred that working capital planning was given due importance in the Financial Strategy adopted in Biomass power plants since it is very relevant and helpful to monitor and control debtors and provide credit finance for maintaining short-term liquidity.

Table 6.12 - Working Capital Planning

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	56	37.3	37.3	37.3
Strong	48	32.0	32.0	69.3
Moderate	22	14.7	14.7	84.0
Low Emp.	13	8.7	8.7	92.7
No Emp.	11	7.3	7.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.12 - Working Capital Planning

iii. Cash Flow Planning

Cash flow planning ensures timely payment of debts, smooth operation of day-to-day activities, payment of salaries and dividends on time, etc. Efficient cash flow planning system helps in building the reputation and brand equity of the plant. In other words, failure to meet the payment obligations spells disaster to the reputation of the plant besides the risk of bringing the plant to a standstill. Hence, cash flow planning is very critical for biomass power plants to properly plan the cash that comes in and goes out so that payment commitments are honored and reputation not affected.

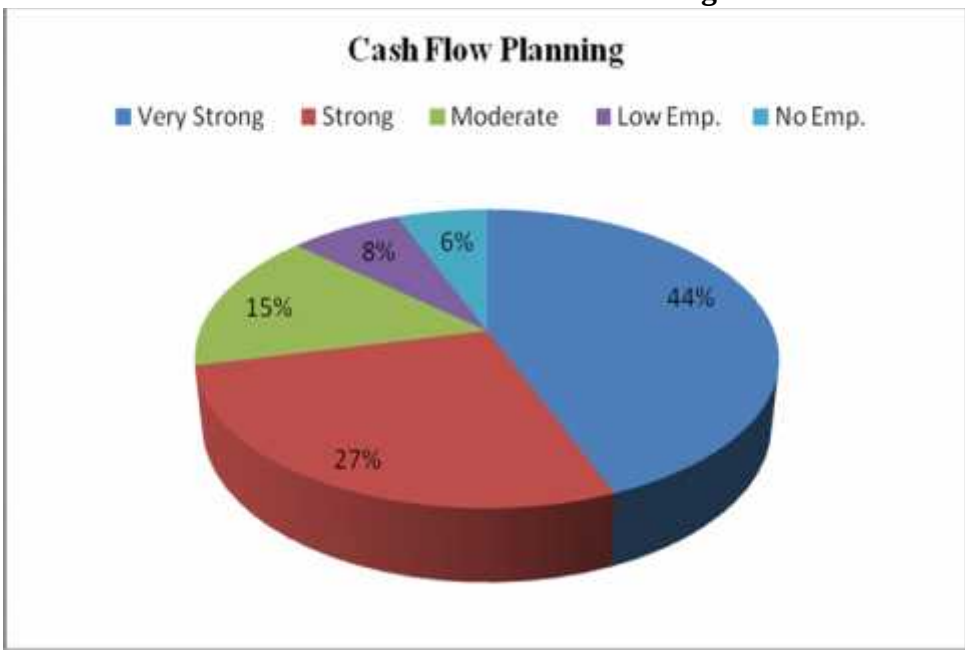
The respondents' views have been analyzed to understand how they feel about the importance given to cash flow planning in the Financial Strategy of Biomass power plants. The results of the analysis as shown in Table 6.13 and Exhibit 6.13 reveal that 66 respondents representing 44 per cent placed 'very strong emphasis', 27.3 per cent 'strong emphasis', 15.3 per cent 'moderate emphasis', 7.4 per cent 'low emphasis', and 6.0 per cent 'no emphasis' respectively on this. On the basis of the above analysis, it can be concluded that cash flow planning was given importance in the Financial Strategy of Biomass power plants as it is very essential to carry out the operations of the plant in a viable way.

Table 6.13 - Cash Flow Planning

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	66	44.0	44.0	44.0
Strong	41	27.3	27.3	71.3
Moderate	23	15.3	15.3	86.7
Low Emp.	11	7.4	7.4	94.0
No Emp.	9	6.0	6.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.13 - Cash Flow Planning



iv. Capital Structure Planning

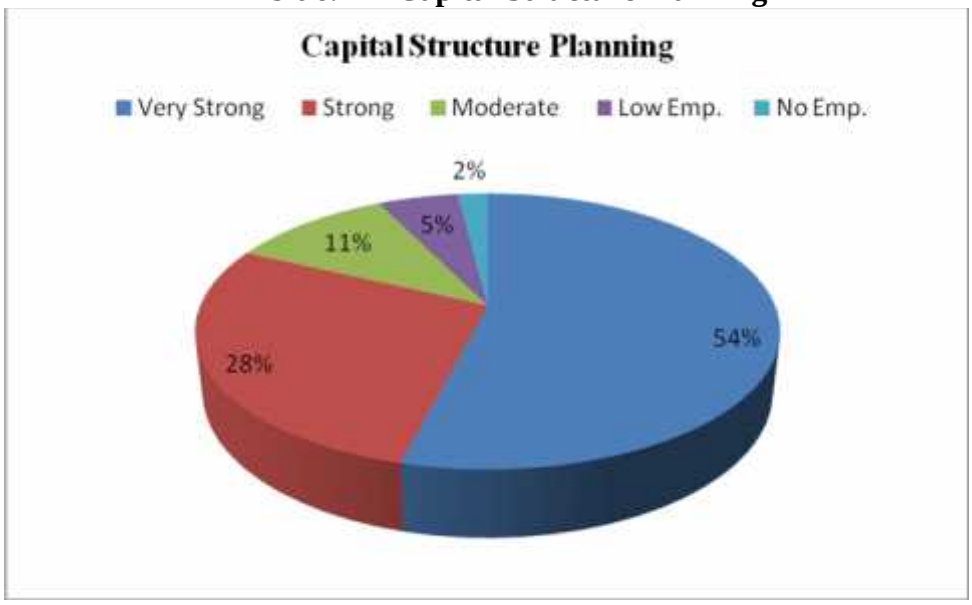
The capital structure planning encompasses the functions that bring in a proper mix of debt and equity. Financial prudence suggests that when debt is cheaper than equity and its earning potential is high due to the nature of the industry, it is always worthwhile to have high exposure to debt. This is referred to as 'leverage'. The study attempted to analyze the priority given to this aspect of Financial Strategy. The results of the analysis as shown in Table 6.14 Exhibit 6.14 reveal that 81 respondents representing 54.0 per cent expressed 'very strong emphasis', 28.0 per cent 'strong emphasis' on capital structure planning. The study also reveals that 16 respondents representing 10.7 per cent expressed 'moderate emphasis', 5.3 per cent 'low emphasis', and 2.0 per cent 'no emphasis' respectively on this. It can be inferred from the above analysis that capital structure planning was considered as an important component of Financial Strategy followed in biomass power plants as it determines the cost of capital and valuation of the plant.

Table 6.14 - Capital structure planning

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	81	54.0	54.0	54.0
Strong	42	28.0	28.0	82.0
Moderate	16	10.7	10.7	92.7
Low Emp.	8	5.3	5.3	98.0
No Emp.	3	2.0	2.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.14 - Capital Structure Planning



v. Profit Planning

Profit planning refers to determining in advance how much profit a plant has to earn and from which avenues, so that financial commitments are honored on time without causing damage to either reputation or operations. Particularly, dividends to equity shareholders and repayments to creditors have to be made on time. Similarly, investments have to be made in new projects to create new sources of revenues. All these activities drive the need for profit planning, which is analyzed in Table 6.15 and the Exhibit 6.15. The analysis reveals that 52 respondents representing 34.6 per cent expressed 'strong emphasis', 49 respondents representing 32.7 per cent given 'very strong emphasis', 31

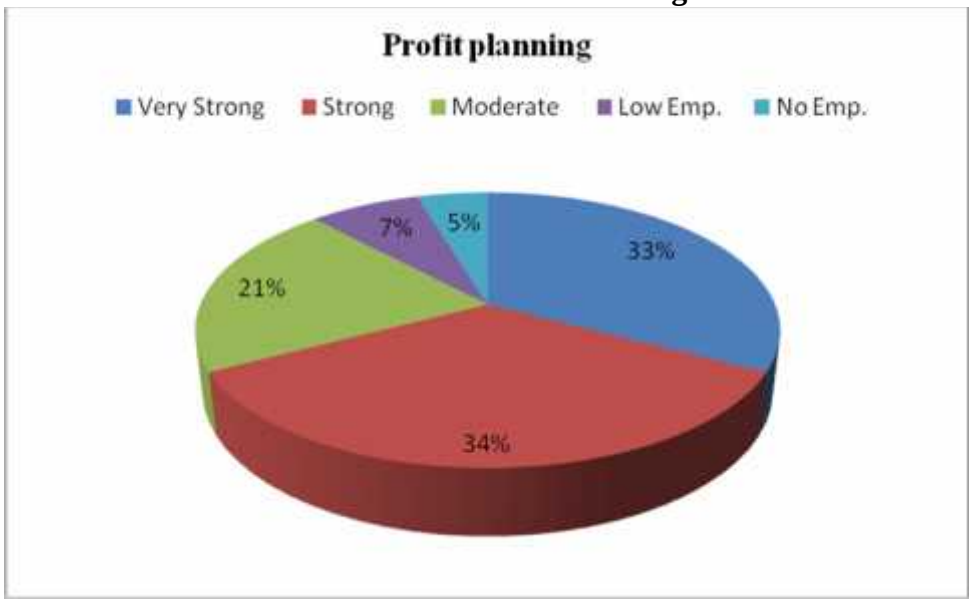
respondents representing 20.7 per cent 'moderate emphasis', 7.3 per cent 'low emphasis', and 4.7 per cent 'no emphasis' respectively on this. The study reveals that profit planning was given priority in Biomass power plants as it will help in understanding the earning capacity as well as the availability of funds to meet the financial commitments of the Plant.

Table 6.15 - Profit planning

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	49	32.7	32.7	32.7
Strong	52	34.6	34.6	67.3
Moderate	31	20.7	20.7	88.0
Low Emp.	11	7.3	7.3	95.3
No Emp.	7	4.7	4.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.15 - Profit Planning



vi. Taxation planning

Taxation planning is out of the essential aspects of Financial Strategy. Meeting the tax obligations have to be planned properly, that too well in advance, as inadequate planning will result in huge accumulation of tax arrears and avoidable pressure from the tax authorities. Sometimes, a plant is brought to a grinding halt solely due to tax problems. This study attempted to understand the views of the respondents with regard to the priority given to taxation planning in the Financial Strategy. The results of the analysis as shown in Table 6.16 and Exhibit 6.16 reveal that 53 respondents representing 35.4 per cent placed only 'moderate emphasis' and 47 respondents representing 31.3 per cent placed 'strong emphasis' on taxation planning. The analysis also reveals that only 28 respondents representing 18.7 per cent placed 'very strong emphasis', 9.3 per cent 'low emphasis', and 5.3 per cent 'no emphasis' respectively.

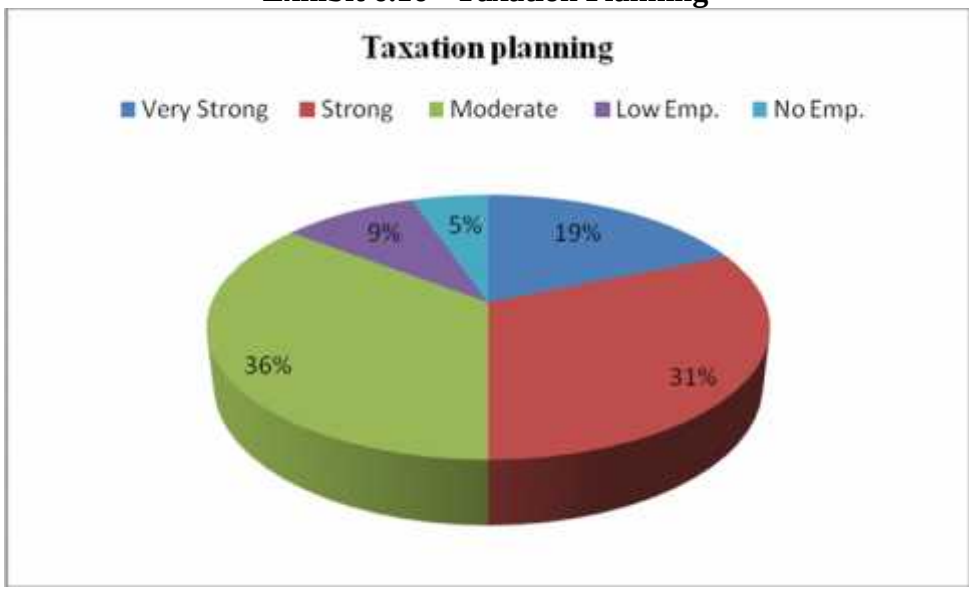
From the opinions expressed by the respondents, it can be assumed that taxation planning was not given due importance in the Financial Strategy of biomass power plants, though it will help the plant to pay taxes on time and also take advantage of all deductions, exemptions, allowances, and rebates to minimize the tax liability.

Table 6.16 - Taxation planning

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	28	18.7	18.7	18.7
Strong	47	31.3	31.3	50
Moderate	53	35.4	35.4	85.4
Low Emp.	14	9.3	9.3	94.7
No Emp.	8	5.3	5.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.16 - Taxation Planning



6.1.4 HUMAN RESOURCE STRATEGY

Human resource management (HRM) deals with the "people" dimension of the organization. HRM is the term increasingly used to refer to the philosophy, policies, procedures and practices relating to the management of people within organizations. Since every organization is made up of people, acquiring their services, developing their skills, motivating them to higher levels of performance, and ensuring that they continue to maintain their commitment to the organization are essential in achieving organizational objectives. Organizations that are able to acquire, develop, motivate and retain talented human resources will be both effective and efficient. If human resources are neglected or mismanaged, the organization is unlikely to succeed.

At the same time, however, human resource management is one of the most complex and challenging fields of modern management. Though an organization's physical assets are major factors in determining its success, it has now been recognized that it is the employees or human resources which provide competitive advantage to an organization. Especially in Biomass power plants, HR skills are an important soft asset which is the key to their superior performance. Talent has to be acquired, inducted, trained, appraised, and promoted or got rid of. In the current era, brand valuation relies more on human resources than hard assets like machinery and buildings.

The salient features of HR strategy adopted in Biomass power plants are analyzed in the present study which include estimating manpower requirement, recruitment planning, career planning, planning of training and development activities, planning for improvement in morale and motivation, succession planning, employee relations, employee participation, etc.

i. Estimating Human Resource Requirements

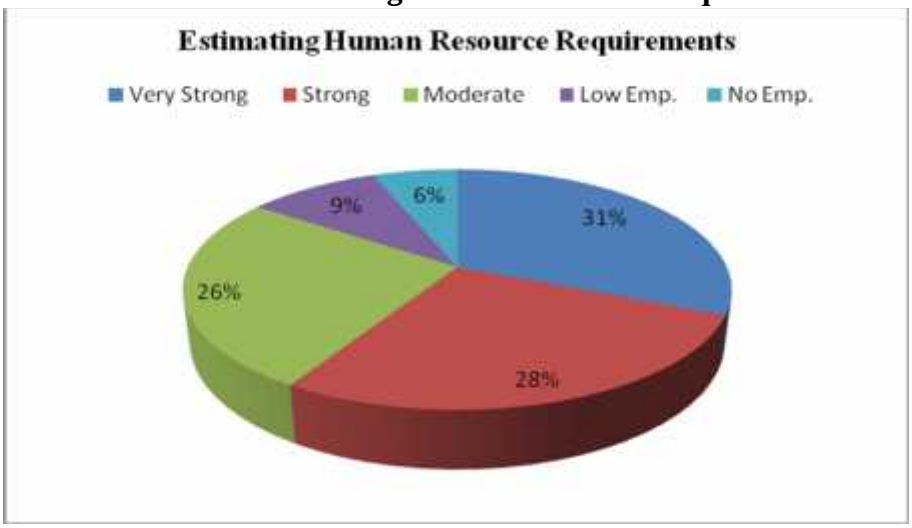
The foremost task of HRM in Biomass power plants is HR planning or estimation of human resource requirements. The plant has to carry out HR planning to maintain optimum levels of personnel at various levels. This study made an attempt to understand the importance given to estimating human resource requirements in the HR strategy adopted in Biomass power plants. The results of the analysis as shown in Table 6.17 and Exhibit 6.17 reveal that 47 respondents representing 31.3 per cent expressed 'very strong emphasis', 27.4 per cent 'strong emphasis', 26.0 per cent 'moderate emphasis', 9.3 per cent 'low emphasis', and 6.0 per cent 'no emphasis' respectively. It can be inferred that estimating human resource requirements was given due importance in HR strategy adopted by the Biomass power plants as it is important to match the demand and supply of human skills in biomass power plants. It is suggested that the Biomass power plants need to give more thrust to manpower planning so as to enable them to optimize the number of employees and also maintain appropriate cadre-wise mix in order to increase productivity and profitability of the respective plants.

Table 6.17 - Estimating Human Resource Requirements

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	47	31.3	31.3	31.3
Strong	41	27.4	27.4	58.7
Moderate	39	26.0	26.0	84.7
Low Emp.	14	9.3	9.3	94.0
No Emp.	9	6.0	6.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.17 - Estimating Human Resource Requirements



ii. Recruitment Planning

On similar lines of HR planning, an attempt has been made to understand the importance given to recruitment planning. Recruitment planning is all about finding out where prospective job applicants are located and motivating them to apply for suitable jobs in the plant so that they can be pooled up and their suitability to the positions available in the organization is assessed. The results of the analysis as presented in Table 6.18 and Exhibit 6.18 give an overall view of the emphasis given to recruitment planning in biomass power plants. The analysis reveals that 51 respondents representing 34.0 per cent placed 'very strong emphasis' and 46 respondents representing 30.7 per cent 'strong emphasis' on the importance of recruitment planning. The study also reveals that 39 respondents representing 26.0 per cent gave 'moderate emphasis' and 12 respondents representing 8.0 per cent 'low emphasis', and 1.3 per cent 'no emphasis' respectively on this. On the basis of the analysis presented above, it can be concluded that recruitment planning was given due importance in the HR strategy of Biomass power plants as it is important for filling the job vacancies on time in the plant.

Table 6.18 - Recruitment planning

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	51	34.0	34.0	34.0
Strong	46	30.7	30.7	64.7
Moderate	39	26.0	26.0	90.7
Low Emp.	12	8.0	8.0	98.7
No Emp.	2	1.3	1.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.18 - Recruitment Planning

iii. Career Planning

Employees want a career, not merely a job; this implies that they would naturally want to grow in the organization. Organizations should therefore help employees to build their careers and provide suitable growth to them. Career planning has a motivating effect since a person seeing a promising career in the same plant will stick to it and contribute his best to the plant. The biomass power industry is quite determined and committed about this aspect of HRM as they plan careers of employees and remain ready with able employees for succession. The results of the analysis as shown in Table 6.19 and Exhibit 6.19 reveal that 72 respondents representing 48.0 per cent placed 'very strong emphasis' and 36 respondents representing 24.0 per cent 'strong emphasis' on career planning. The analysis of the study also reveals that 27 respondents representing 18.0 per cent placed

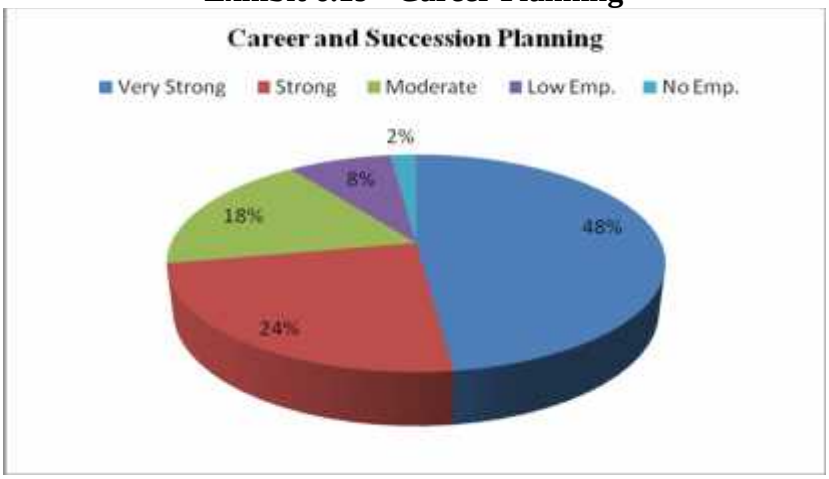
'moderate emphasis', 8.0 per cent 'low emphasis', and 2.0 per cent 'no emphasis' respectively. It can be inferred from the above analysis that career planning was considered very important in Biomass Power plants as it helps the process of identification and development of internal people to occupy important position in the organization, which in turn help to improve the employee commitment and retention.

Table 6.19 - Career Planning

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	72	48.0	48.0	48.0
Strong	36	24.0	24.0	72.0
Moderate	27	18.0	18.0	90.0
Low Emp.	12	8.0	8.0	98.0
No Emp.	3	2.0	2.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.19 - Career Planning



iv. Planning for training and development activities

Employee development is very critical to the growth of a plant since it prepares the employees for both future and current challenges. Training and development is one of the high performance work practices (HPWPs) paving the way for successful operation of biomass power plants without facing skill shortages. A systematic and regular training at

least for 40 hours in a year for every employee is a recipe for success of Biomass power plants. The study has attempted to find out the views of the respondents about the importance given to training and development planning in the HR strategy . The results of the analysis as shown in Table 6.20 and Exhibit 6.20 reveal that 49 respondents representing 32.7 per cent placed only 'moderate emphasis', 27.3 per cent 'strong emphasis', 22.7 per cent 'very strong emphasis', 11.3 per cent 'low emphasis', and 6.0 per cent 'no emphasis' respectively on this. It can be inferred that though planning for training and development activities was essential to nurturing the employees and capitalizing on their talents, majority of the respondents placed only "moderate or low emphasis" on this important aspect of HR strategy in Biomass power plants. It is suggested that Biomass power plants should give due emphasis to training and development activities in the plant.

Table 6.20 - Planning for Training and Development Activities

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	34	22.7	22.7	22.7
Strong	41	27.3	27.3	50.0
Moderate	49	32.7	32.7	82.7
Low Emp.	17	11.3	11.3	94.0
No Emp.	9	6.0	6.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.20- Training and Development Activities

v. Planning for Improvement in Morale and Motivation

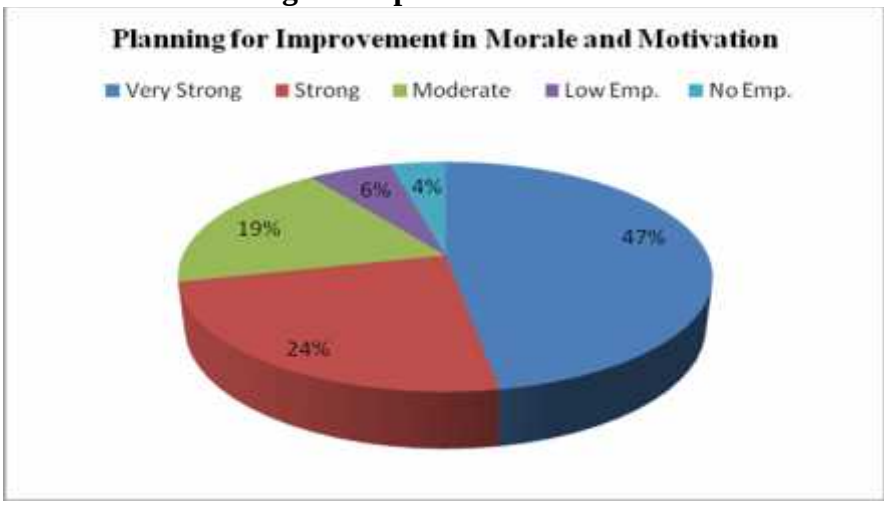
When employees are highly motivated towards the vision and mission of the plant, and fully engaged with operations of the plant, the 'going' of the plant would be naturally smooth and robust. When employees are at the lowest point of morale, labour productivity will be low and attrition rate will be high. Employees should see 'promise' in their future and organizations should offer attractive incentives, employee benefits, rewards, etc., to keep the morale of the employees high. The results of the analysis as shown in Table 6.21 and Exhibit 6.21 reveal that 71 respondents representing 47.3 per cent placed 'very strong emphasis', 36 respondents representing 24.0 per cent 'strong emphasis', 18.7 per cent 'moderate emphasis', 6.0 per cent 'low emphasis', and 4.0 per cent 'no emphasis' respectively on this. Based on the above analysis it can be concluded that planning for improvement in morale and motivation were considered important for employees to perform their jobs more enthusiastically and to achieve organizational goals and as such this element was given due emphasis in the HR strategy of biomass power plants.

Table 6.21 - Planning for Improvement in Morale and Motivation

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	71	47.3	47.3	47.3
Strong	36	24.0	24.0	71.3
Moderate	28	18.7	18.7	90.0
Low Emp.	9	6.0	6.0	96.0
No Emp.	6	4.0	4.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.21 - Planning for Improvement in Morale and Motivation



vi. Employee relations

Employee relations refer to relation between the management and unions. Many problems do arise out of work situations such as resistance to workload, complaints about poor work facilities, low salaries, ineffective grievance handling mechanism, etc. They have to be prevented by proper handling of employee relations. The Biomass power plants should understand employee sensitivities by continuously interacting with them and addressing their problems as quickly as possible before they get worse and develop into industrial disputes. Keeping this in view an attempt is made to know the respondents' views on their relations with the managements in the respective plants.

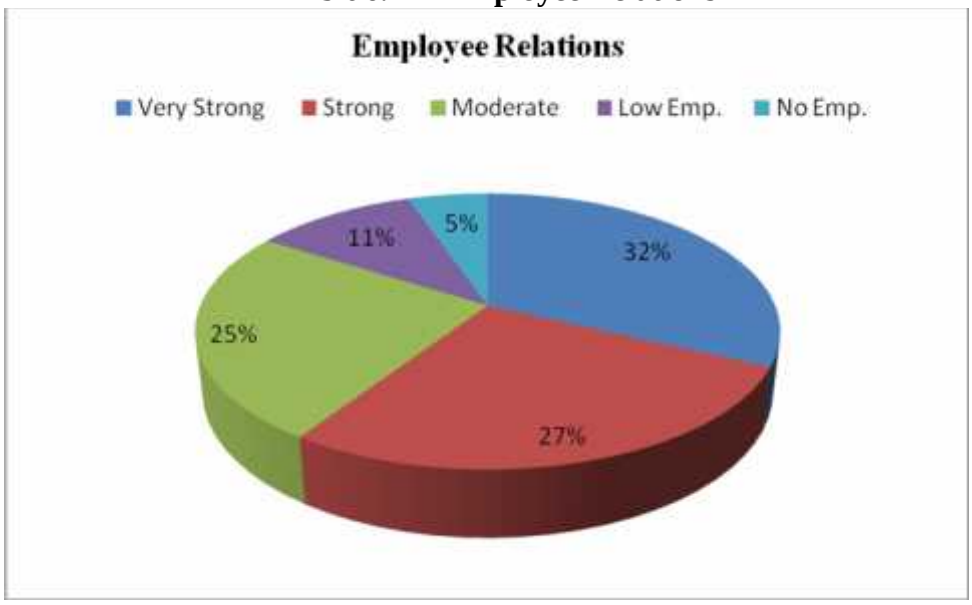
Table 6.22 and Exhibit 6.22 depicts that 48 respondents representing 32.0 per cent laid 'very strong emphasis', 27.3 per cent 'strong emphasis', 24.7 per cent 'moderate emphasis', 10.7 per cent 'low emphasis', and 5.3 per cent 'no emphasis' respectively on this. It can be inferred from the above analysis that employee relations was given due emphasis in the HR strategy of Biomass power plants which is absolutely essential for identifying and resolving the problems of employees which arise out of work situations.

Table 6.22 - Employee Relations

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	48	32.0	32.0	32.0
Strong	41	27.3	27.3	59.3
Moderate	37	24.7	24.7	84.0
Low Emp.	16	10.7	10.7	94.7
No Emp.	8	5.3	5.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.22 - Employee Relations



vii. Succession Planning

Succession planning refers to planning for filling the key positions that fall vacant when managers quit or retire. The second aspect of succession planning involves preparing employees ready to occupy key positions through appropriate training and development so that there are enough able candidates to occupy the positions that are likely to fall vacant due to separations like retirements, removals, resignations, promotions, etc. The results of the analysis as shown in Table 6.23 and Exhibit 6.23 reveal that 48 respondents representing 32.0 per cent placed 'moderate emphasis', 24.7 per cent 'strong emphasis', 22.0 per cent 'very strong emphasis', 12.0 per cent 'low emphasis', and 9.3 per cent 'no

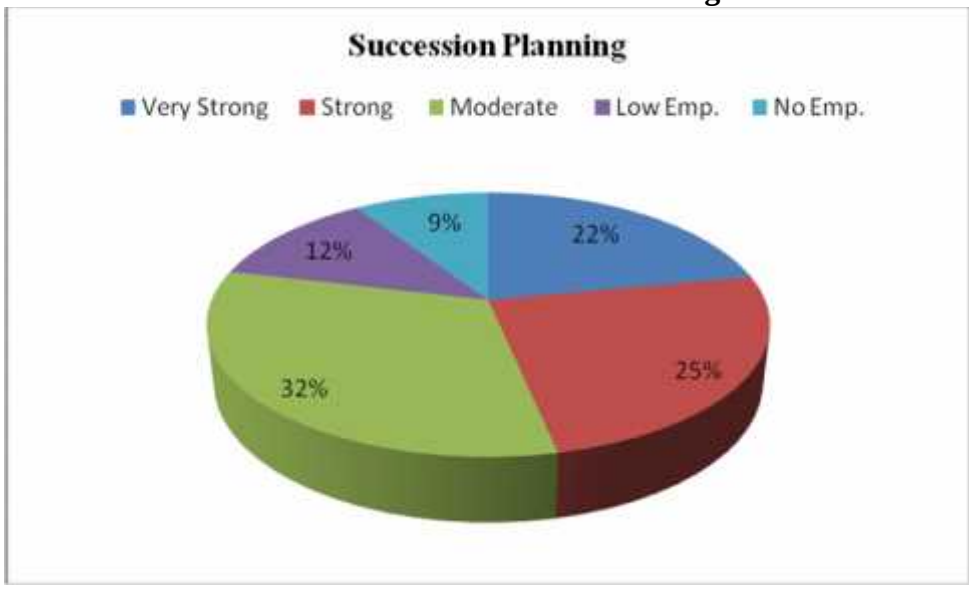
emphasis' respectively. From the above analysis, it can be inferred that due importance was not given to succession planning in biomass power plants though it increases the availability of experienced and capable employees to occupy key positions in the plant. Hence, it is suggested that the power plants need to initiate steps to develop internal people to take up higher positions in all categories. If internal people are not available persons from outside need to be recruited at the next below level and groomed to take up higher positions.

Table 6.23 - Succession Planning

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	33	22.0	22.0	22.0
Strong	37	24.7	24.7	46.7
Moderate	48	32.0	32.0	78.7
Low Emp.	18	12.0	12.0	90.7
No Emp.	14	9.3	9.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.23 - Succession Planning



viii. Employee Participation

Employee participation refers to employees becoming a part of decision-making process. Employees need to be involved in decisions on workload, working hours, altering service conditions, investments in new projects etc. Such participation helps in effective implementation of the plans and programmes of the plant. Quite interestingly, the majority of respondents gave very less priority to employee participation. The results of the analysis as shown in Table 6.24 and Exhibit 6.24 reveal that 57 respondents representing 38.0 per cent laid only 'moderate emphasis', 24.0 per cent 'strong emphasis', 22.7 per cent 'very strong emphasis', 12.7 per cent 'low emphasis', and 2.6 per cent 'no emphasis' respectively on this. On the basis of the above analysis, it can be inferred that Employee Participation was not given due emphasis in HR strategy of Biomass power plants. It is, therefore, suggested that Biomass power plants should involve all levels of employees in decision-making processes in the true spirit of industrial democracy which ultimately enhances employee engagement and promotion of the business.

Table 6.24 - Employee Participation

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	34	22.7	22.7	84.7
Strong	36	24	24	62
Moderate	57	38	38	38
Low Emp.	19	12.7	12.7	97.4
No Emp.	4	2.6	2.6	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.24 - Employee Participation

6.1.5 TECHNOLOGY STRATEGY

Technology has become one of the most crucial factors that decide competitiveness of organizations. Technology development is a dynamic process aimed at continuous improvement, be it in efficiency, quality, cost effectiveness or customer satisfaction. Replacing obsolete technology with new technology is essential to derive the benefits of technology advancements and retain a competitive edge. The changing environmental regulations also necessitated adoption of environment-friendly technology.

The present analysis revealed that the Technology strategy of Biomass power plants focuses on continuous technological up-gradation for improving productivity, making processes more efficient and highly reliable for improving cost effectiveness. The Technology Strategy adopted by Biomass power plant was analyzed under the following heads: (i) identification of areas needing technological up-gradation, (ii) judicious selection of technology, (iii) replacement of old technology, and (iv) exploitation of the adopted technology to the optimum extent.

i. Technology up-gradation

Technology refers to all machines, processes, and methods employed by a biomass power plant to produce and deliver output. Depending on the ability, user expectations, and competitive business environment, appropriate technology needs to be adopted to ensure effective generation and delivery of power. Importantly, technology has its own life cycle and technology up-gradation addresses the problems that arise from the technology life cycle and so it has to be properly planned. Otherwise plant will be left behind saddled with obsolete technology. Keeping this in view an attempt is made to know the emphasis given by the respondents for technology up-gradation.

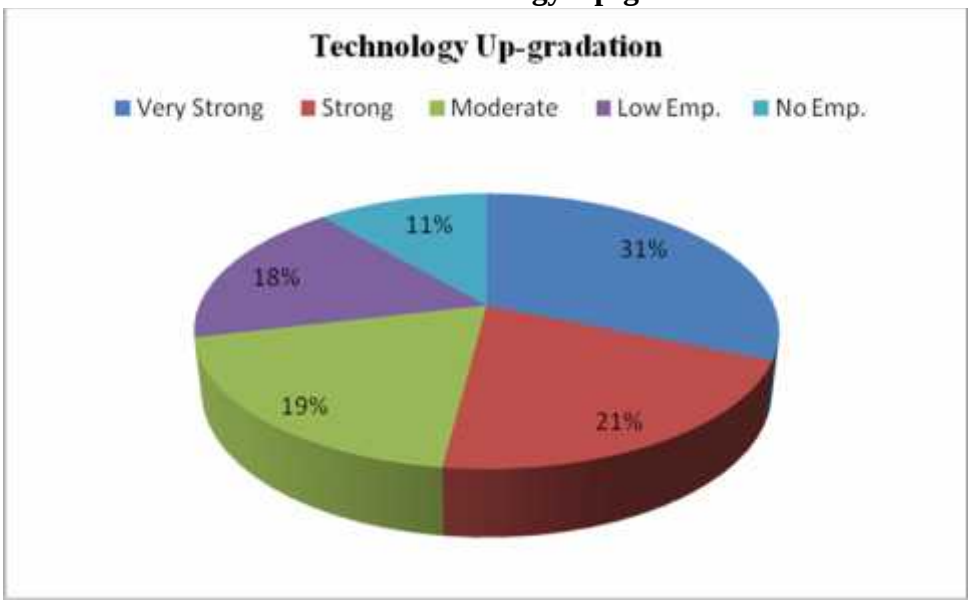
As it can be seen from the Table 6.25 and Exhibit 6.25 reveal that 47 respondents representing 31.3 per cent gave 'very strong emphasis', 20.7 per cent 'strong emphasis', 19.3 per cent 'moderate emphasis', 17.4 per cent 'low emphasis', and 11.3 per cent 'no emphasis' respectively on this. On the basis of the data obtained from the respondents which was analyzed and presented in the Table, it can be inferred that technology up-gradation was given due importance in Biomass power plants as it is very important to have contemporary levels of technology to attain international levels of competitiveness.

Table 6.25 - Technology Up-gradation

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	47	31.3	31.3	31.3
Strong	31	20.7	20.7	52.0
Moderate	29	19.3	19.3	71.3
Low Emp.	26	17.4	17.4	88.7
No Emp.	17	11.3	11.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.25 - Technology Up-gradation



ii. Judicious Selection of Technology

When the plant chooses the technology, it faces the challenge of several alternative technologies. The management should choose the most appropriate technology so that it is not left behind the competition but at the same time should not be saddled with the heavy burden of the cost of advanced technology. The management should, therefore, be judicious while selecting the technology. The caveat is that some new advanced technology from overseas may be available but it may not suit the local conditions of raw materials or skill levels.

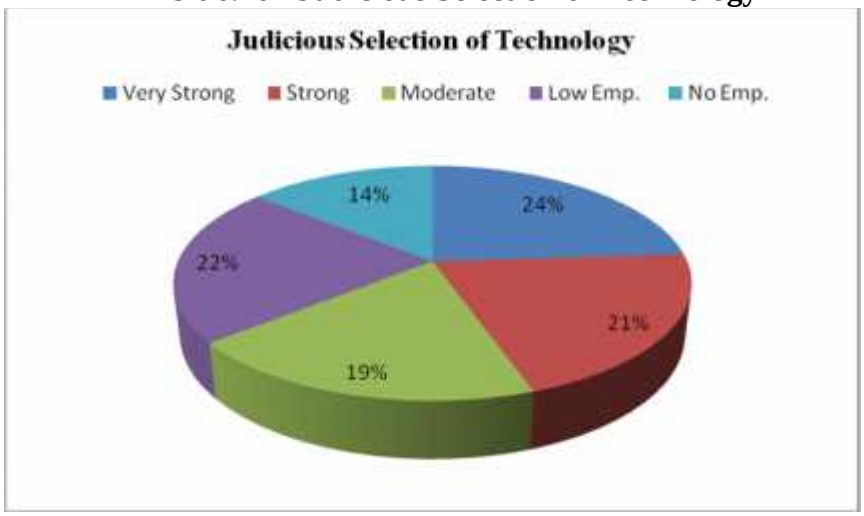
Table 6.26 and Exhibit 6.26 reveal that 36 respondents representing 24.0 per cent placed 'very strong emphasis', 20.7 per cent 'strong emphasis', 19.3 per cent 'moderate emphasis', 22.0 per cent 'low emphasis', and 14.0 per cent 'no emphasis' respectively on this aspect. From the analysis presented above, it can be inferred that judicious selection of technology was given due importance in biomass power plants as it helps the plants to operate efficiently with the state-of-the-art technology and not saddled with obsolete technology.

Table 6.26 - Judicious Selection of Technology

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	36	24.0	24.0	24.0
Strong	31	20.7	20.7	44.7
Moderate	29	19.3	19.3	64.0
Low Emp.	33	22.0	22.0	86.0
No Emp.	21	14.0	14.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.26 - Judicious Selection of Technology



iii. Replacement of old Technology

Replacement of old technology is another important aspect of Technology Strategy. Interaction with experts in the field reveal that replacement of old technology is not an important issue since fluid bed technology is used very effectively for biomass power generation in the State. The views of respondents have been obtained on the importance given to replacement of old technology. The results of the analysis as given in Table 6.27 and Exhibit 6.27 confirm this. The analysis reveals that 43 respondents representing 28.7 per cent placed 'low emphasis', 22.0 per cent 'moderate emphasis', 19.3 per cent 'strong emphasis', 16.0 per cent 'very strong emphasis', 14.0 per cent 'no emphasis' respectively. It can be inferred from the above analysis that the biomass power plants

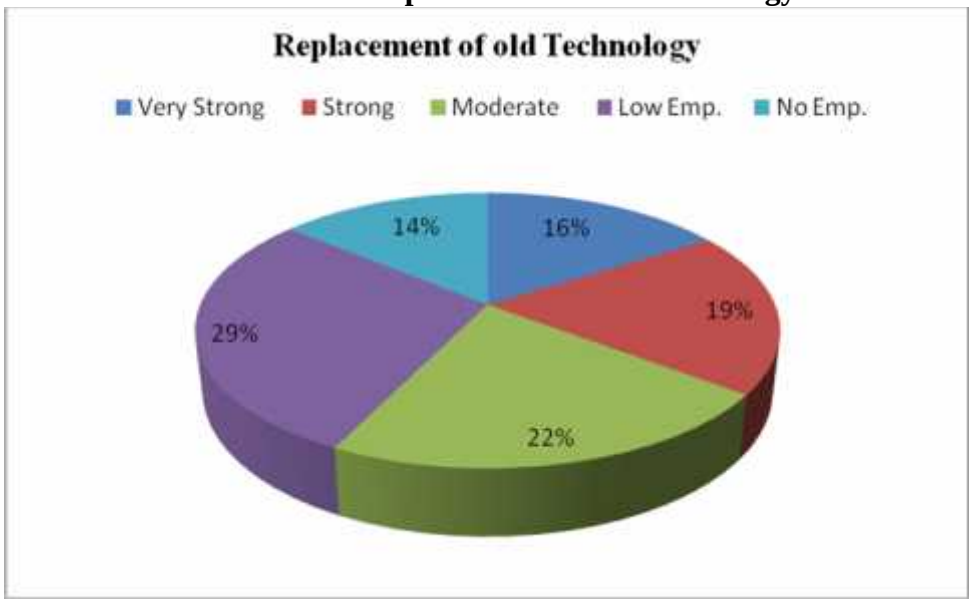
gave the least importance to the issues relating to replacement of old technology as they are confident that fluid bed technology can be effectively used for biomass power generation. In view of this, it is suggested that there is an urgent need to make cost efficiency analysis with the existing technology and based on the results of such an analysis, the Biomass power plants should not hesitate to replace the old technology with the latest modern technology which will not only be cost effective but also facilitates the plant to face the competition comfortably.

Table 6.27 - Replacement of old Technology

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	24	16.0	16.0	16.0
Strong	29	19.3	19.3	35.3
Moderate	33	22.0	22.0	57.3
Low Emp.	43	28.7	28.7	86.0
No Emp.	21	14.0	14.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.27 - Replacement of old Technology



iv. Exploitation of Adopted Technology to the Maximum

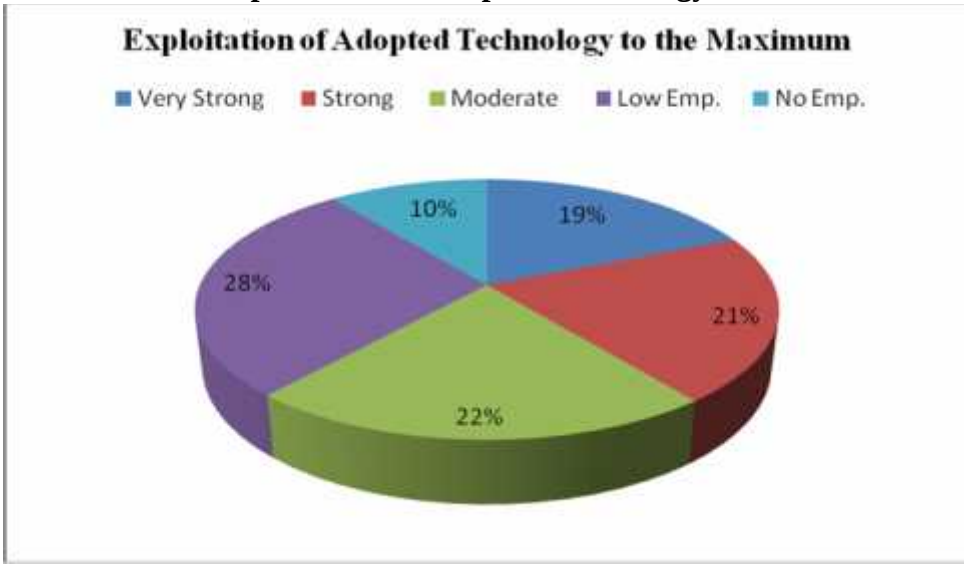
The technology adopted should be fully utilized and taken the maximum advantage of, so that the productivity improves besides a substantial increase in delivery efficiency. If it is not so, sunk costs will impact the profit and loss account and balance sheets; it is needless to say that they ultimately make negative contribution to the plant's financial health. The respondents' views are ascertained to know what kind of importance is given to exploitation of adopted technology. Table 6.28 and Exhibit 6.28 reveal that 28.0 per cent laid 'low emphasis', 22.0 per cent 'moderate emphasis', 20.7 per cent 'very strong emphasis', 18.7 per cent 'strong emphasis', 10.6 per cent 'no emphasis' respectively. On the basis of the above analysis, it can be inferred that exploitation of adopted technology was not given much importance as the biomass power plants had not increased the capacity of the plants. This is a lacuna that needs to be rectified by the plants in so far as the Technology Strategy is concerned.

Table 6.28 - Exploitation of Adopted Technology to the Maximum

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	28	18.7	18.7	18.7
Strong	31	20.7	20.7	39.4
Moderate	33	22.0	22.0	61.4
Low Emp.	42	28.0	28.0	89.4
No Emp.	16	10.6	10.6	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.28 - Exploitation of Adopted Technology to the Maximum



6.1.6 LOGISTICS STRATEGY

Logistics refers to storing and moving of raw material and finished products as and when necessary so that they are made available with minimum cost and maximum convenience. The logistic strategy guides the organization to develop a number of strategies for product lines, specific customer and specific business etc. The ultimate positive outcome of the logistics strategy is ensuring raw material and finished goods at their consumption points at the right time, so that costs are minimized and benefits maximized. The analysis of Logistics Strategy adopted in Biomass power plants covers two important aspects viz., receipt of raw materials and inward transportation of materials which are examined below:

i. Receipt of Raw Materials

Raw material should be quickly received and made available for use. Timely receipt of raw materials is very important for Biomass power plants as it determines the cost of power generation. The results of the analysis as shown in Table 6.29 and Exhibit 6.29 reveal that 74 respondents representing 49.3 per cent placed ‘very strong emphasis’, 19.3 per cent ‘strong emphasis’, 18.0 per cent ‘moderate emphasis’, 8.7 per cent ‘low emphasis’, and 4.7 per cent ‘no emphasis’ respectively. It may be inferred from the above

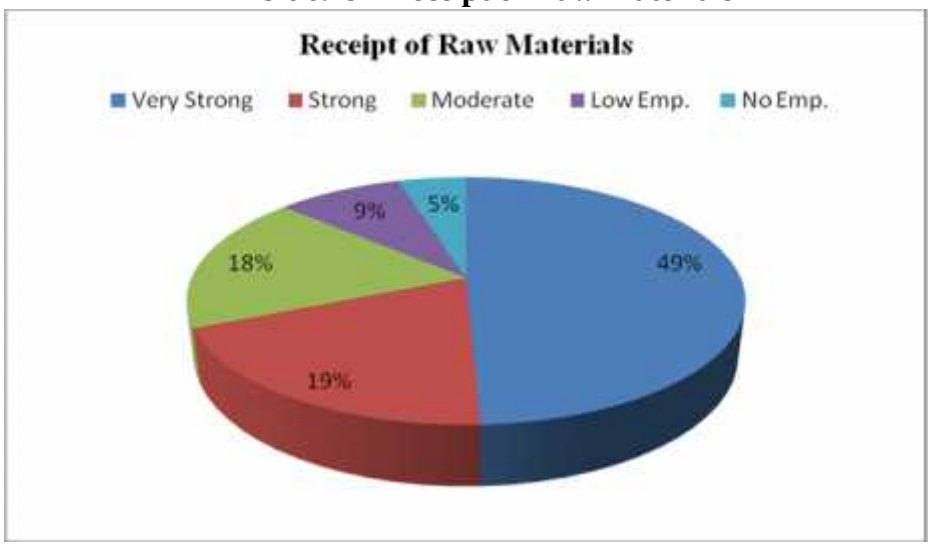
analysis that receipt of raw materials was given due importance in the Logistics Strategy of Biomass power plants as it determines the cost of production.

Table 6.29 - Receipt of Raw Materials

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	74	49.3	49.3	49.3
Strong	29	19.3	19.3	68.6
Moderate	27	18.0	18.0	86.6
Low Emp.	13	8.7	8.7	95.3
No Emp.	7	4.7	4.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.29 - Receipt of Raw Materials



ii. Inward Transportation

The system for the materials (mainly, raw materials) that are transported to and received into plant's premises is referred to as 'inbound logistics' which is a source of value creation. Cost effectiveness, timely delivery, and delivery without causing damage to the goods are the goals of effective management of inbound logistics. The system should ensure cost-effective transportation of raw materials into the plant. The results of the analysis as shown in Table 6.30 and Exhibit 6.30 reveal that 51 respondents representing

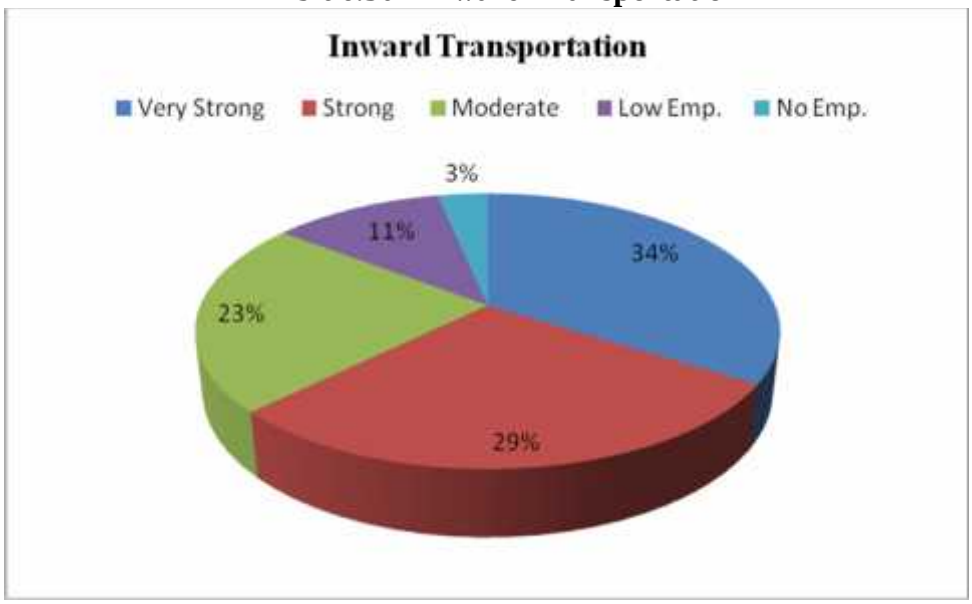
34.0 per cent placed ‘very strong emphasis’, 28.7 per cent ‘strong emphasis’, 22.7 per cent ‘moderate emphasis’, 11.3 per cent ‘low emphasis’, and 3.3 per cent ‘no emphasis’ respectively. From the above analysis, it may be inferred that inward transportation was given due importance in the Logistics Strategy of Biomass power plants as it forms an important component of the total cost of raw material purchased and is highly relevant to Biomass power plants.

Table 6.30 - Inward Transportation

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	51	34	34	34
Strong	43	28.7	28.7	62.7
Moderate	34	22.7	22.7	85.4
Low Emp.	17	11.3	11.3	96.7
No Emp.	5	3.3	3.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data

Exhibit 6.30 - Inward Transportation



6.2 FUNCTIONAL STRATEGIES IN BIOMASS POWER PLANTS: AN APPRAISAL

An important purpose of the present study is to analyze the salient features and components of key functional strategies adopted in Biomass power plants under study and to examine their impact on the performance of the plants. With the above objective in view, the salient features of important functional strategies are briefly examined and the emphasis placed on the components are analyzed based on the opinions gathered from the respondents and also interaction with the experts in the field of Biomass power plants.

Different components of the Production Strategy adopted in Biomass power plants and the priorities assigned by the respondents are analyzed. It is observed form the above analysis that high priority was accorded to 'plant layout' (81.4 per cent), 'capacity utilization' (78.6 per cent), 'efficiency of raw material utilization' (78.6 per cent), production scheduling (75.3 per cent), inventory planning (72 per cent), and 'plant maintenance' (69.3 per cent). However, areas like waste control and material handling received less emphasis even though, in actual practice, the managements of biomass power plants gave adequate importance to these areas also to reduce the overall cost of production.

An analysis of the Marketing Strategy adopted in Biomass power plants revealed that both the important aspects of 'distribution system' (71.4 per cent) and 'market information system' (70.6 per cent) received high priority. Components like product mix decisions, pricing policies, promotion and advertising, etc., are not applicable to Biomass power plants as the power produced is purchased by the State government on the basis of the tariff rates fixed by APERC from time to time.

Different components of the Financial Strategy adopted in Biomass power plants and the priorities assigned by the respondents are analyzed. It is observed form the analysis that high priority was accorded to capital structure planning (82 per cent), cash flow planning (71.3 per cent), capital expenditure planning (69.3 per cent), working capital planning

(69.3 per cent), and profit planning (67.3 per cent). The basic reason for this high emphasis, as gathered during interaction with experts, was the investments and the accompanying costs involved therein, needed more systematic financial planning by Biomass power plants.

Further rising costs of raw materials, increased wages and other inputs were the important factors which necessitated high priority to profit planning, working capital planning, etc. Taxation planning received less emphasis in the financial planning process of Biomass power plants though it is intimately related to profit planning. It is suggested that Biomass power plants should give due priority to taxation aspects of Financial Strategy.

It is observed from the data collected in respect of various components of HR strategy and the priorities assigned to them by the respondents, high priority was accorded to HR planning (78.7 per cent), career planning (72 per cent), planning for improvement in morale and motivation (71.3 per cent), recruitment planning (64.7 per cent) and employee relations (59.3 per cent). The principal reasons for this focused emphasis, as noted during interaction with the experts of Biomass power plants, were small size of the organization, shortage of skilled manpower, and high competitiveness leading to increased thrust on productivity. It is also observed that planning for training and development activities, succession planning and employee participation received only moderate or low priority from the respondents. The researcher disagrees with the opinion of the respondents in this regard because, as revealed in interactions with the experts of Biomass power plants, adequate importance was given to training and development activities of employees.

The components of Technology Strategy collected through questionnaire and the priorities assigned by the respondents to various elements of the technology strategy, it is clear that the respondents gave high priority to judicious selection of technology (64.7 per cent) and technology up-gradation (52.0 per cent), while replacement of old technology and exploitation of adopted technology to the maximum were given less priority. As is evident, both judicious selection of technology and its up-gradation have been supporting the operations of the Biomass power plants in producing electricity from biomass with less production break-downs and hold-ups. As per the secondary data obtained, most of the Biomass power plants under study were commissioned between 2002 and 2004. With the passage of time, the need for improving the health of the equipment was acutely felt.

Further, due to advancements in Biomass power technology, there was need to adopt latest technology in the plants as per the changing needs. From the above analysis, it may be inferred that Technology Strategy adopted in Biomass power plants needs to be recast so that latest technology is adopted to improve the quality of product and reduce costs in several production processes of Biomass power plants.

It is observed from the analysis of Logistics Strategy that the respondents emphasized both receipt of raw materials (78.6 per cent) and inward transportation (72.7 per cent) as they are the two important thrust areas of the Logistics Strategy. From this analysis, it can be inferred that the Logistics Strategy adopted in Biomass power plants contains the most important components which have been helping the plants to reduce the transportation costs and production costs thereby improving the financial position of Biomass power plants.

6.3 IMPACT OF FUNCTIONAL STRATEGIES ON OVERALL PERFORMANCE

The results of the study depicts that the functional strategies in the areas viz., Production, Finance, Marketing, HR, Technology and Logistics - reinforce the performance-driving power of vision, mission, objectives and their impact was significant on the performance of Biomass power plants. The outcome of the study on the overall performance of the Biomass power plants is briefly discussed below:

Production Strategy helps the plant in achieving the targeted production and ensuring its full capacity utilization. Production-related issues include those of raw materials, workforce, fuels, and plant maintenance. Production Strategy ensures smooth rollout of output by putting in order the plant, workforce and raw material. The Biomass power plants streamlined their operations with the help of the Production Strategy adopted by them. This fact is attested by Production strategy's regression coefficient which is 0.404. In fact, of all the functional strategies, Production strategy has contributed the most to the overall performance.

Another important functional strategy that has the next most impact on overall performance is Financial Strategy. Inadequate finance or unused finance or high-cost of finance severely affects the functional efficiency of Biomass power plants. This strategy has helped the plants by securing finance for both short-term and long- term purposes, and putting them to the best use. According to this study, the contribution of financial strategy to the overall performance is significant. The same is attested by the regression coefficient of 0.355. Financial strategy is the second most important strategy that contributes to the overall performance.

The contribution of HR strategy is also moderately significant to the overall performance of the plant. The strategy has helped the Biomass power plants in acquisition of the right workforce, training them, paying the right compensation, and retaining them. In fact, HR strategy is the key differentiator since it motivates itself and drives the performance when it is properly managed. The regression coefficient of HR is 0.245; importantly, this beta is significant, since the p-value is <0.05.

As regards Technology Strategy, its contribution to overall performance, according to this research, is significant as attested by the beta value of 0.210. It is significant since the corresponding p-value is <0.05. Technology, which encompass all the methods and processes that a plant uses in all of its operations, is an important factor, and a wrong choice of technologies available on the shelves might seriously affect the production process. It is needless to say that good technology gives a competitive edge and has the potential to reduce overall operating costs.

The contribution of Logistics strategy with a regression coefficient of 0.201 is also significant since the corresponding p-value is <0.05. As Logistics strategy determines how material is transported into and out of premises and where it is kept for use, it has the potential to improve the overall efficiency of the plant. According to this study, the impact of Logistics strategy on overall performance is significant.

As regards marketing strategy, its impact on overall performance is insignificant. The regression coefficient is 0.116 and the corresponding p-value is >0.05. It is evident from the study that there is no impact of Marketing strategy on the overall performance of Biomass power plants. Since the power produced by Biomass power plants is purchased only by the government agency (a single buyer), there is no point in expecting a significant relationship between the Marketing strategy and the overall performance.

On the whole, it can be inferred that most of the important components of functional strategies were given due emphasis and that they have a significant impact on the performance of Biomass power plants. This finding supports Hypothesis (H_3 - a) that comprehensive functional strategies have been adopted by Biomass power plants which have significant impact on their performance. This finding is further corroborated by the Correlation Analysis and Multiple Regression Analysis which are briefly explained below.

6.4 CORRELATION ANALYSIS

In this section, the results of inter-correlation among strategies and other variables have been examined and presented in Table 6.31. It is observed from the Table that the significant results of the inter correlation among the strategies adopted by Biomass power plant reveal that they are all positively correlated with each other. There is high correlation between production and technology strategies (0.64), production and financial strategies (0.78), production and marketing strategies (0.66), HR and production strategy (0.74), technology and logistics strategies (0.62), etc. Overall, there is a positive correlation among all the functional strategies. From the above analysis, it may be inferred that there are inter-correlations among various functional strategies adopted in Biomass power plants.

Table 6.31: Pearson correlations among Strategies undertaken by Biomass power plant

Performance measure	Functional Strategies					
Correlations Marked correlations are significant at p < .05 N= 150 (Case wise deletion of missing data)						
	Prodn.	Fin.	Mktg.	HR	Tech.	Logistics
Production.	1.00					
Finance	0.78	1.00				
Marketing	0.66	0.32	1.00			
HR	0.74	0.43	0.54	1.00		
Technology	0.62	0.25	0.45	0.42	1.00	
Logistics	0.52	0.25	0.57	0.35	0.22	1.00

Note: Significant at 0.05 levels.
Source: Computed from primary data.

6.5 MULTIPLE REGRESSION ANALYSIS

A set of multiple regressions were calculated considering performance as dependent variable and the functional strategies adopted by Biomass power plants as independent variable. The influence of strategies on overall performance of the Biomass power plants has been assessed and the summary of the multiple regressions is presented in Table 6.32. It is observed from the Table that the overall performance of Biomass power plants is significantly influenced by the functional strategies viz., production strategy, financial strategy and technology strategy. The variables considered explain 94.3 per cent variation in the overall performance.

6.6 NEED FOR ADDITIONAL STRATEGIES

In this section, the additional strategies that need to be adopted by Biomass power plants to ensure their successful operation and sustained growth. Company-wide strategies (often referred to as corporate strategies) are focused on overall strategy and the choice of

direction for the organization as a whole. It involves decisions relating to the choice of businesses, allocation of resources among different businesses, transferring skills and capabilities from one set of businesses to others, and managing and nurturing the portfolio of businesses in such a way as to obtain "synergy" among various product lines and business units. Strategies at this level are usually focused on long-term growth and survival and will include major decisions such as expansion, acquisitions and mergers, joint ventures, strategic alliances, etc. By crafting and executing appropriate corporate strategies, the firm seeks to add value to the shareholders' wealth.

Table 6.32: Multiple Regression for Strategies Vs Performance

Coefficients Marked coefficients are significant at p < .05 N= 150(Case wise deletion of missing data)				
	Strategies adopted	Overall performance		
	Total (150)	B	SE	p-value
	Intercept	15.17	1.7345	0.0000
	A. Functional Strategies			
	Production strategy	0.4041	0.1143	0.0212
	Financial strategy	0.3546	0.1486	0.0245
	Marketing strategy	0.1161	0.1487	0.0694
	HR Strategy	0.2448	0.1045	0.0342
	Technology strategy	0.2102	0.1236	0.0546
	Logistics strategy	0.2011	0.1002	0.0041
	F value	74.3490		
	R^2	0.7430		
	Adjusted R^2	0.6320		

Note: Significant at 0.05 levels. B:Slope SE: Standard Error

Source: Computed from primary data.

It is surprising to note that the Biomass power plants are not adopting any systematic corporate and business strategies as they consider them irrelevant to small businesses.

6.7 CORPORATE STRATEGIES FOR BIOMASS POWER PLANTS

Growth strategies are the most widely pursued corporate strategies by small businesses. Organizations that do not grow are pushed out of their business arenas by competitors and other new entrants. Further, growth helps the firms to create economies of scale and scope, serve as a motivational force for managers, increase the prestige of firms, bestow advantages of experience curve and lead to many social benefits. Most importantly, they help in effective utilization of resources. Sustaining growth is a key challenge to business leaders in an enterprise (Glueck, 1980; Secchi and Boltazzi, 2005). Organizations that do business in expanding industries such as generation of electricity must grow to survive. A business can grow internally by expanding its capacities or operations or by setting up of new plants or it can grow externally through backward or forward integration, or diversification strategies such as mergers, acquisitions, joint ventures, strategic alliances, etc. Further, the business strategies are also examined to find out whether they contribute positively to the competitive advantage and significantly impact the performance of the Biomass power plants.

i. Expansion Strategy

Business expansion is a stage of an organization's life that is fraught with both opportunities and perils. Every successful organization should think about increasing its market share in order to stay in business for a longer period. For the purpose of increasing market share they have to necessarily expand their production capacities, diversify product-mix, look for new customers in the established markets and penetrate into new markets with proper promotional strategies. The expansion often carries with it a corresponding risk for financial fortunes of the organization.

The most usual methods by which a company increases its business is through acquisition of another existing business, setting up of a new plant, expansion of production capacities, pursuing new markets, etc. For the purpose of present study expansion of Biomass power plants is considered in terms of both increasing production capacities and expanding of markets for the product. An overall analysis of the expansion strategy

required for Biomass power plants reveals that it is advantageous for them to go in for expansion of the plant capacities:

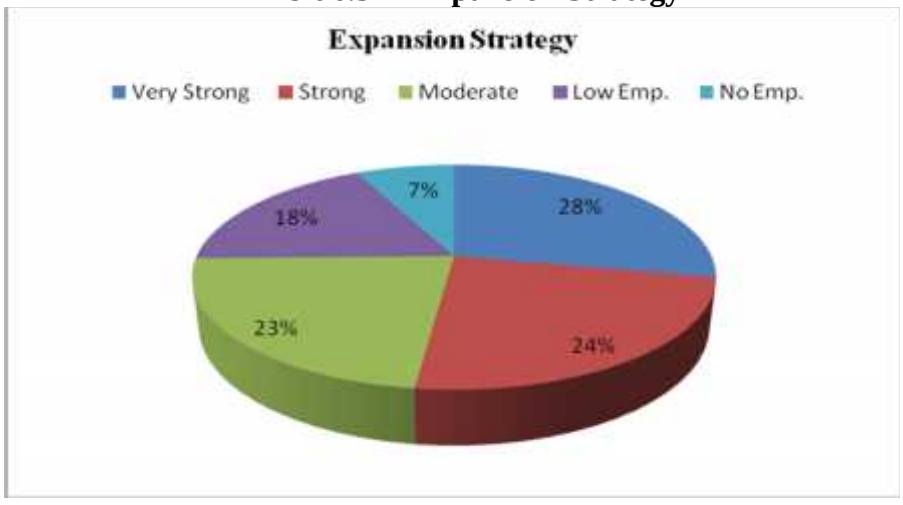
The results of the analysis as shown in Table 6.33 and Exhibit 6.31 reveal that 28.0 per cent of the respondents laid 'very strong emphasis', 24.0 per cent 'strong emphasis', 22.7 per cent 'moderate emphasis', 18.0 per cent 'low emphasis', and 7.3 per cent 'no emphasis' on expansion strategy respectively. From the above analysis, it may be inferred that expansion strategy is strongly recommended for Biomass power plants as it helps in achieving the economies of scale.

Table 6.33 - Expansion Strategy

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	42	28.0	28.0	28.0
Strong	36	24.0	24.0	52.0
Moderate	34	22.7	22.7	74.7
Low Emp.	27	18.0	18.0	92.7
No Emp.	11	7.3	7.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.31 - Expansion Strategy



This study also explored the bases of expansion strategy, which are the dominant reasons for expansion. Our research attempted to understand why a plant pursues expansion strategy. The common reasons are scaling up of investment, grid stabilization, meeting the demand etc. The results of the analysis are presented in Table 6.34 and Exhibit 6.32.

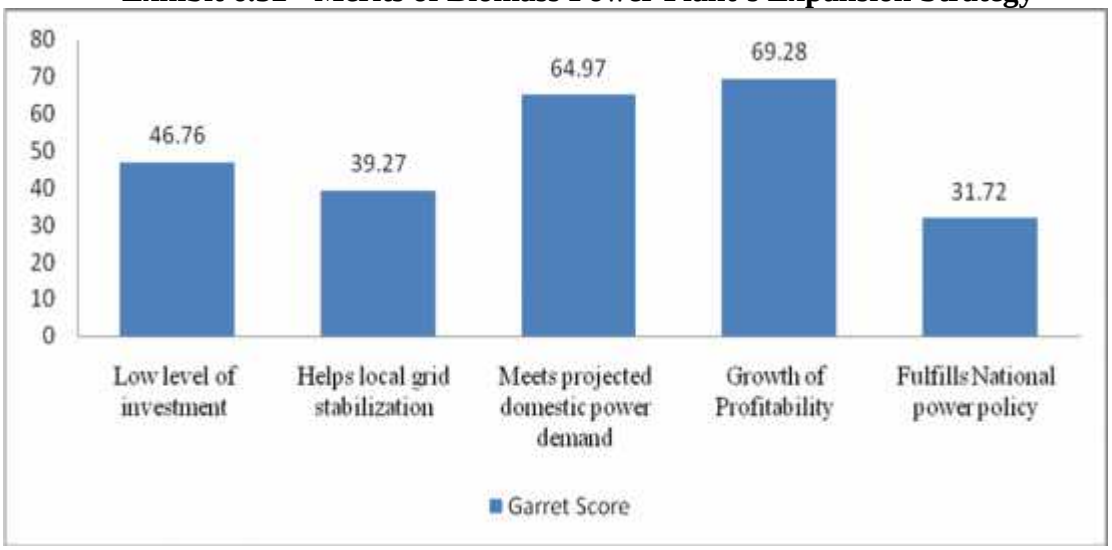
The results show the Garrett Rank Mean score of each possible reason. (1) Growth of profitability (69.28), (2) meeting the domestic demand (64.97), and (3) investment scaling (46.76) are the dominant reasons for expansion.

Table 6.34 - Merits of Biomass Power Plant's Expansion Strategy

Sl. No.	Choice	Garret Ranking Score
1	Low level of investment	46.76
2	Helps local grid stabilization	39.27
3	Meets projected domestic power demand	64.97
4	Growth of Profitability	69.28
5	Fulfills National power policy	31.72

Source: Computed from primary data.

Exhibit 6.32 - Merits of Biomass Power Plant's Expansion Strategy



Demerits of Expansion Strategy

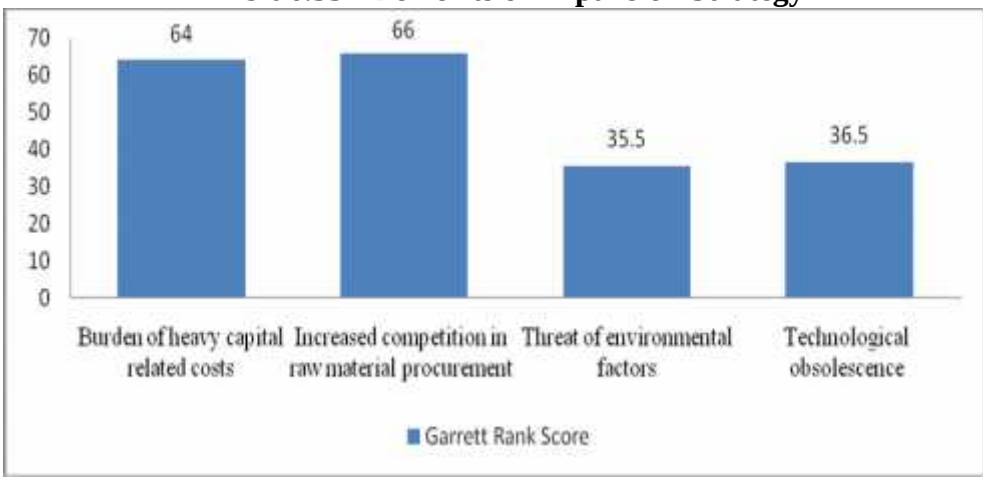
Our study also tried to understand the perceived demerits of expansion strategy. The results of the analysis as presented in Table 6.35 and Exhibit 6.33 show that the main demerits of expansion strategy are (1) increased competition for raw materials (66.0), (2) burden of heavy capital costs (64.0), and (3) technological obsolescence(36.5).

Table 6.35 - Demerits of Expansion Strategy

Sl. No.	Choice	Garrett Rank Score
1	Burden of heavy capital related costs	64
2	Increased competition in raw material procurement	66
3	Threat of environmental factors	35.5
4	Technological obsolescence	36.5

Source: Computed from primary data.

Exhibit 6.33 - Demerits of Expansion Strategy



ii. **Backward Integration**

Backward integration refers to ownership or increased control of raw materials or inputs. As against the above background, the case of Biomass power plants has been examined. It appears that, in the long run, non-availability of biomass raw material will be a serious handicap for Biomass power plants. Inconsistencies in supplies – quality and quantity - along with rising prices have been adversely affecting the financial position of the Biomass power plants. Backward integration is, therefore, absolutely essential for Biomass power plants because substantial expenditure is incurred on account of buying critical raw materials from outside sources.

Keeping the huge requirement of raw materials in view, the Biomass power plants are generally set up at places near raw material sources. However, with competition from brick manufactures, hotels and other biomass power plants for procurement of raw

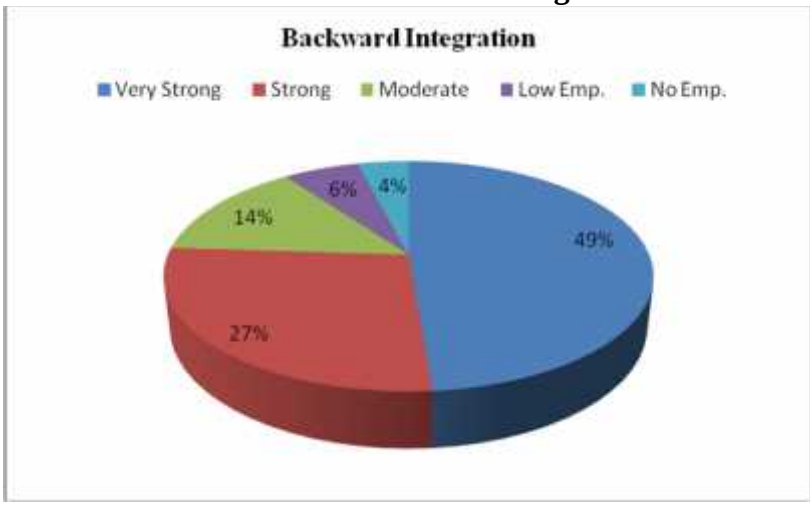
material, their prices are shooting up erratically and availability of quality raw material has become a challenge for biomass power plants. Upstream activities like production of power and other related services depend on control over the downstream activities. In simple terms, gaining control over raw materials empowers the Biomass power industry, which is an important objective of 'backward integration'. The results of the analysis as shown in Table 6.36 and Exhibit 6.34 reveal that 48.7 per cent of the respondents gave 'very strong emphasis', 27.3 per cent 'strong emphasis', 14.0 per cent 'moderate emphasis', 6.0 per cent 'low emphasis', and 4.0 per cent 'no emphasis' respectively. It may be inferred from the above analysis that backward integration is very much helpful for continued supply of raw material and reduction of overall costs.

Table 6.36 - Backward Integration

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	73	48.7	48.7	48.7
Strong	41	27.3	27.3	76.0
Moderate	21	14.0	14.0	90.0
Low Emp.	9	6.0	6.0	96.0
No Emp.	6	4.0	4.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.34 - Backward Integration



iii. Mergers & Acquisitions

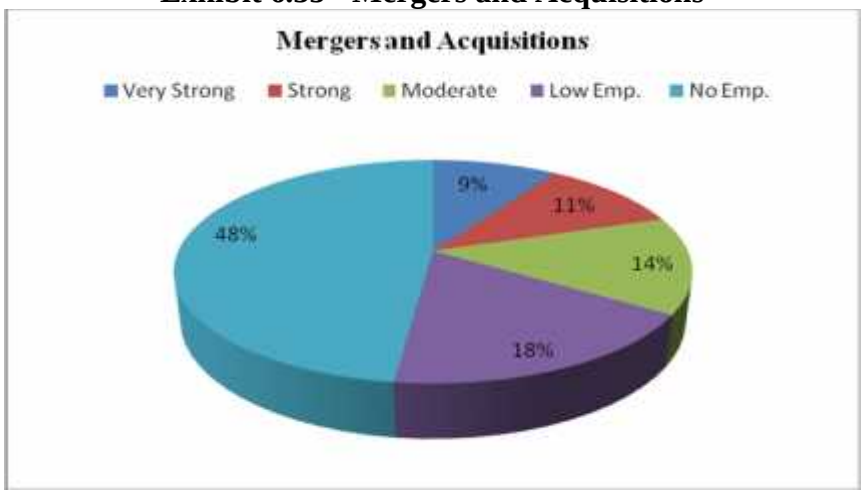
Mergers and Acquisitions facilitate the combination of two or more organizations to take advantage of businesses that helps them for elimination of competition and rapid growth. Mergers and Acquisitions is an option for large industrial houses or those hungry of quick expansions. An attempt is made to know the emphasis is given by the respondents for mergers and acquisitions. Table 6.37 and Exhibit 6.35 reveal that 48.0 per cent of the respondents placed 'no emphasis' 18.0 per cent 'low emphasis', 14.0 per cent 'moderate emphasis', 10.7 per cent 'strong emphasis' and 9.3 per cent ' very strong emphasis', respectively. From the above analysis, it can be inferred that mergers and acquisitions are not preferred by the respondents as Biomass power industry consists of plants of smaller scale and diversification is not much of relevance to them.

Table 6.37 - Mergers and Acquisitions

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	14	9.3	9.3	9.3
Strong	16	10.7	10.7	20
Moderate	21	14	14	34
Low Emp.	27	18	18	52
No Emp.	72	48	48	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.35 - Mergers and Acquisitions



On the whole, it may be concluded from the above analysis that expansion strategies is very essential for Biomass power plants for their sustained growth and need to be pursued as additional strategies.

6.8 BUSINESS STRATEGIES FOR BIOMASS POWER PLANTS

While corporate strategy focuses on long-term survival and growth of the company as a whole, business level strategy is concerned with how a particular business unit successfully competes in the market. The central thrust of a business strategy therefore is how to build and strengthen firm's long-term competitive position.

Porter's Model

There are many models for analyzing business strategies. Michael Porter's generic strategies provide the most popular model. Porter made a major contribution to the field of strategic management by grouping the business strategies into three generic strategies, as shown in Table 6.46, through which a firm can successfully compete in the market:

a. Low-cost leadership: The goal of this strategy is to provide a product or service at a price lower than that of competitors while appealing to a broad range of customers. An organization aiming at low-cost leadership continually looks for ways to reduce costs.

b. Differentiation: An organization employing this strategy seeks to differentiate its products from competitors' products in ways that appeal to a broad range of buyers. A company employing this strategy searches for features that will make its product or service different from that of competitors and that will encourage customers to pay a premium for it.

c. Focus: A focus strategy involves targeting a narrow segment with customized products or specialized services. Hence, a focus strategy selects a segment or group of segments in the market and tailors its strategy to serve them to the exclusion of others. The focus strategy has two types of variation - *cost focus* and *differentiation focus*. The

goal of cost focus is to offer a low-cost product to a select group of customers, while differentiation focus offers a niche product or service customized to the tastes and requirements of a very narrow market segment.

On an analysis of the business strategies, it can be inferred that the Biomass power plants can pursue the business strategy of only 'low cost leadership' while 'differentiation' and 'focus' strategies are not relevant to them.

6.9 STRATEGIC IMPERATIVES FOR BIOMASS POWER PLANTS

There are certain factors that determine the successful operation of Biomass power plants and ensure their long-term success in the industry which need to be rigorously pursued by all Biomass power plants.

Table 6.38: Michael Porter's Generic Strategies

Low Cost Leadership	Differentiation
Focus (Based on Low Cost)	**Focus (Based on Differentiation)**

Source: Adapted from Competitive Advantage: Creating and Sustaining Superior Performance, by Michel E. Porter, (1985, 1998). The Free Press, New York, pp. 25-26.

Generally, these factors are referred to as 'strategic imperatives' that need to be incorporated in appropriate functional strategies of all Biomass power plants. These strategic imperatives relate to strategic location of the plant, reduction in transport costs, prudent production practices, etc. Therefore, an attempt has been made to identify the strategic imperatives for biomass power plants and assess the importance given to them. The strategic imperatives are briefly discussed below:

i. Strategic Location of the Plant

The general view is that strategic location of the plant makes or mars the success of any Biomass power plant. When a plant is located strategically, access to raw materials,

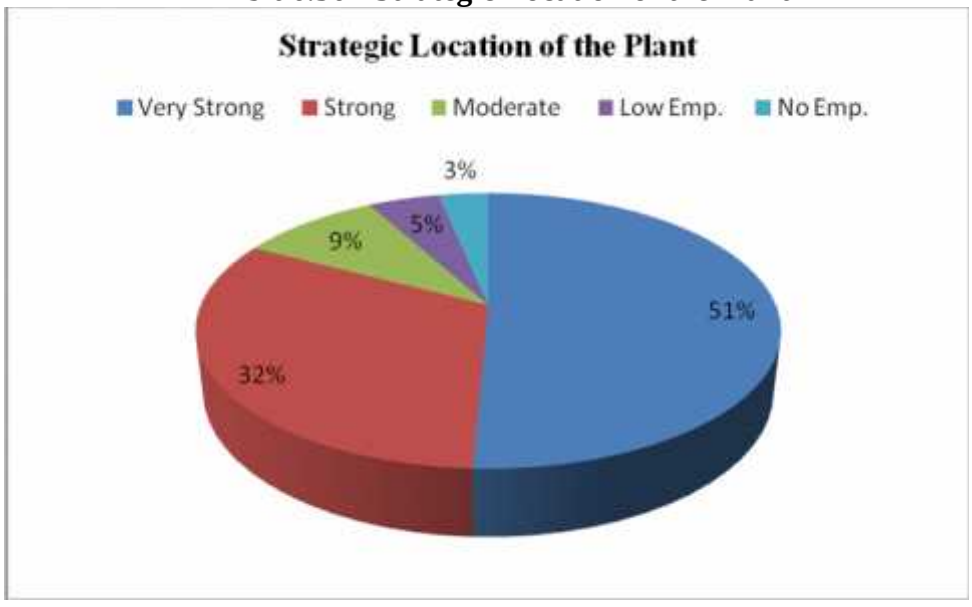
evacuation of power, and availability of skills and manpower are automatically ensured. The study made an attempt to understand how the respondents view the importance of strategic location of the plant. The results of the analysis as shown in Table 6.39 and Exhibit 6.36 reveal that 50.7 per cent of the respondents placed 'very strong emphasis', 32.0 per cent 'strong emphasis', 9.3 per cent 'moderate emphasis', 4.7 per cent 'low emphasis', and 3.3 per cent 'no emphasis' respectively. Hence, it may be inferred that strategic location of the plant is highly relevant for success or failure of Biomass power plants as they provide access to various logistics of biomass power plants and needs to find a prominent place in the relevant functional strategy of Biomass power plants.

Table 6.39 - Strategic Location of the Plant

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	76	50.7	50.7	50.7
Strong	48	32.0	32.0	82.7
Moderate	14	9.3	9.3	92.0
Low Emp.	7	4.7	4.7	96.7
No Emp.	5	3.3	3.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.36 - Strategic Location of the Plant



ii. Efficient procurement of raw materials

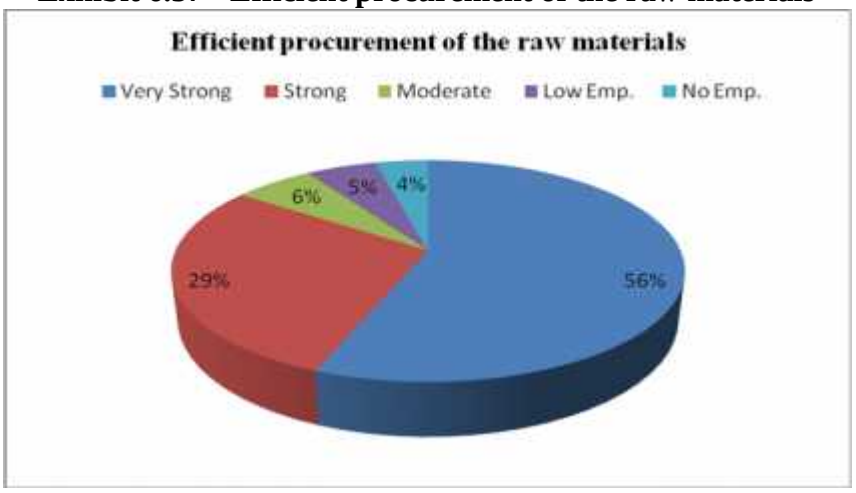
Efficient procurement of raw materials is the key for successful operation of a Biomass power plant as it provides an effective control over the costs in the biomass plants. The study tried to understand how the respondents view the importance of raw material procurement. The results of the study as shown in Table 6.40 and Exhibit 6.37 reveal that 56.0 per cent of the respondents gave 'very strong emphasis', 28.7 per cent 'strong emphasis', 6.0 per cent 'moderate emphasis', 5.3 per cent 'low emphasis', and 4.0 per cent 'no emphasis' respectively. From the above analysis it may be concluded that efficient procurement of raw materials is very much crucial in reducing the cost of power generation and the success or failure of Biomass power plants critically depends on this factor. Therefore, this strategic imperative in the appropriate functional strategy of Biomass power plant.

Table 6.40 - Efficient procurement of the raw materials

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	84	56.0	56.0	56.0
Strong	43	28.7	28.7	84.7
Moderate	9	6.0	6.0	90.7
Low Emp.	8	5.3	5.3	96.0
No Emp.	6	4.0	4.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data**.**

Exhibit 6.37 - Efficient procurement of the raw materials



iii. Cutting Down Costs of Transportation

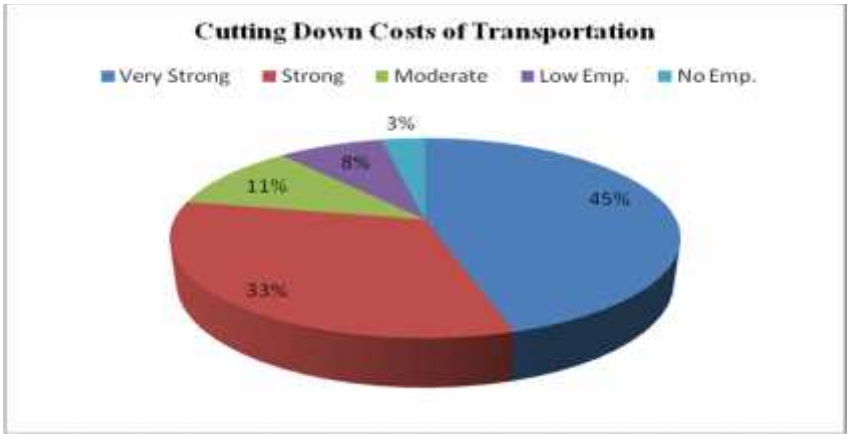
The inbound and outbound logistics are important sources of value creation. It means that a diligent focus on minimizing the transportation costs of raw material goes a long way in running the biomass power plant efficiently. In this study an attempt is made to gauge the view of the respondents about the strategic importance of reducing transportation costs. As it can be seen from Table 6.41 and Exhibit 6.38 that 45.3 per cent of the respondents laid 'very strong emphasis', 32.7 per cent 'strong emphasis', 10.7 per cent 'moderate emphasis', 8.0 per cent 'low emphasis', and 3.3 per cent 'no emphasis' respectively. It may be inferred that cutting down costs of transportation is very much essential for reducing the cost of procurement of raw materials and need to be incorporated in the functional strategies of Biomass power plants.

Table 6.41 Cutting Down Costs of Transportation

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	68	45.3	45.3	45.3
Strong	49	32.7	32.7	78.0
Moderate	16	10.7	10.7	88.7
Low Emp.	12	8.0	8.0	96.7
No Emp.	5	3.3	3.3	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.38 - Cutting down Costs of Transportation



iv. Prudent production practices

Prudent production practices provide a system for ensuring that products are consistently produced and controlled according to the desired quality and quantity. Further, they cover all aspects of production from procurement of raw materials, maintenance of plant and equipment, waste control, etc. Prudent production practices help make maximum use of production capacity and efficient raw material utilization. Table 6.42 and Exhibit 6.39 show that 38.0 per cent of the respondents gave ‘very strong emphasis’, 36.0 per cent ‘strong emphasis’, 17.3 per cent ‘moderate emphasis’, 6.0 per cent ‘low emphasis’, and 2.7 per cent ‘no emphasis’ respectively.

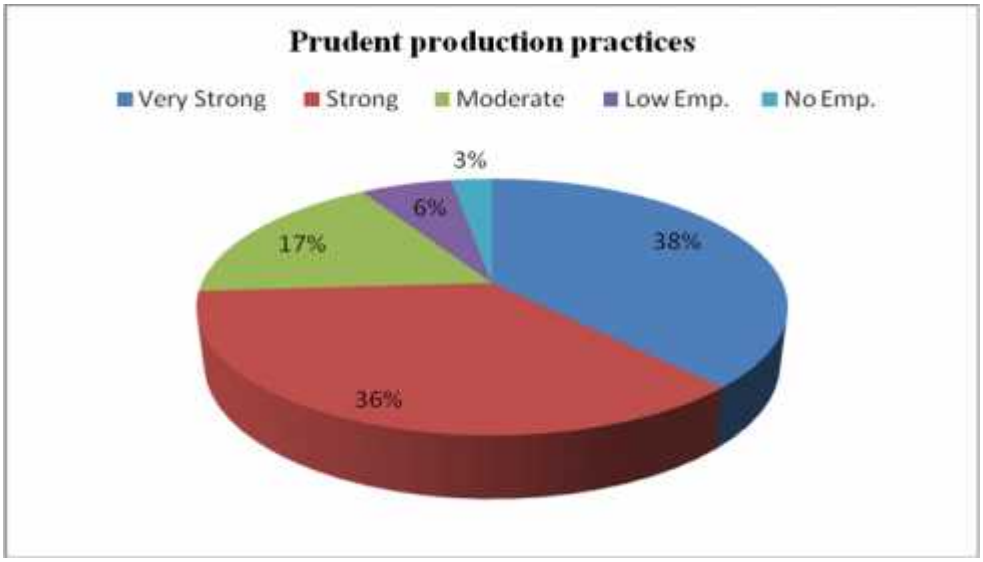
Prudent production practices are very much essential for successful operation of Biomass power plants as they reduce the negative variances between actual and expected levels of production. From the above analysis, it can inferred that prudent production practices is a strategic imperative for all Biomass power plants and need to be incorporated in their functional strategies.

Table 6.42 - Prudent production practices

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	57	38	38	38
Strong	54	36	36	74
Moderate	26	17.3	17.3	91.3
Low Emp.	9	6	6	97.3
No Emp.	4	2.7	2.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.39 - Prudent Production Practices



v. Preventive Maintenance

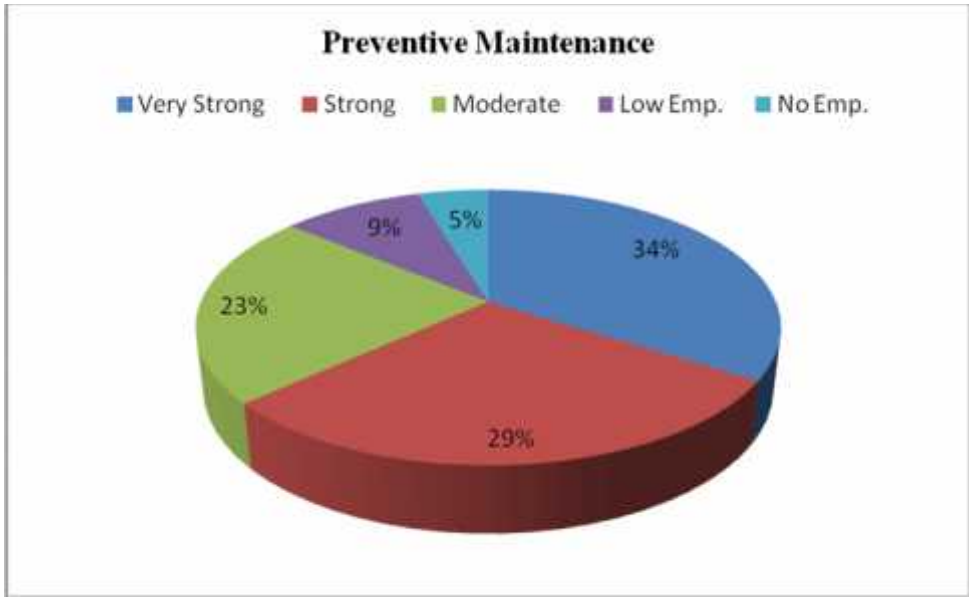
Preventive maintenance is the maintenance which is regularly performed to keep the machinery working without unexpected breakdowns and ensures uninterrupted production. The results of the analysis as shown in Table 6.43 and Exhibit 6.40 reveal that 34.0 per cent of the respondents laid 'very strong emphasis', 29.3 per cent 'strong emphasis', 22.7 per cent 'moderate emphasis', 9.3 per cent 'low emphasis', and 4.7 per cent 'no emphasis' respectively. It may be inferred that preventive maintenance practices are very much essential to eliminate unexpected breakdowns of the plant and consequent production loss and needs to be incorporated in the functional strategies of Biomass power plants.

Table 6.43 - Preventive Maintenance Practices

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	51	34	34	34
Strong	44	29.3	29.3	63.3
Moderate	34	22.7	22.7	86
Low Emp.	14	9.3	9.3	95.3
No Emp.	7	4.7	4.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.40 - Preventive Maintenance



vi. Reduction of Transmission Losses

The units of electric energy generated by the Biomass power plants does not match with the units measured at the respective grids. This is because the power generated in Biomass power plants pass through the electrical lines and reach the power grids wherefrom APTRANSCO supplies to the ultimate consumers through its networks and in the process of supplying electricity to the grid, transmission losses occur. In other words, the difference in the generated and distributed units is known as Transmission loss which is not paid for by APTRANSCO. Transmission losses eat into the profitability of a Biomass power plant since the power generated is lost before it reaches the grid. Table

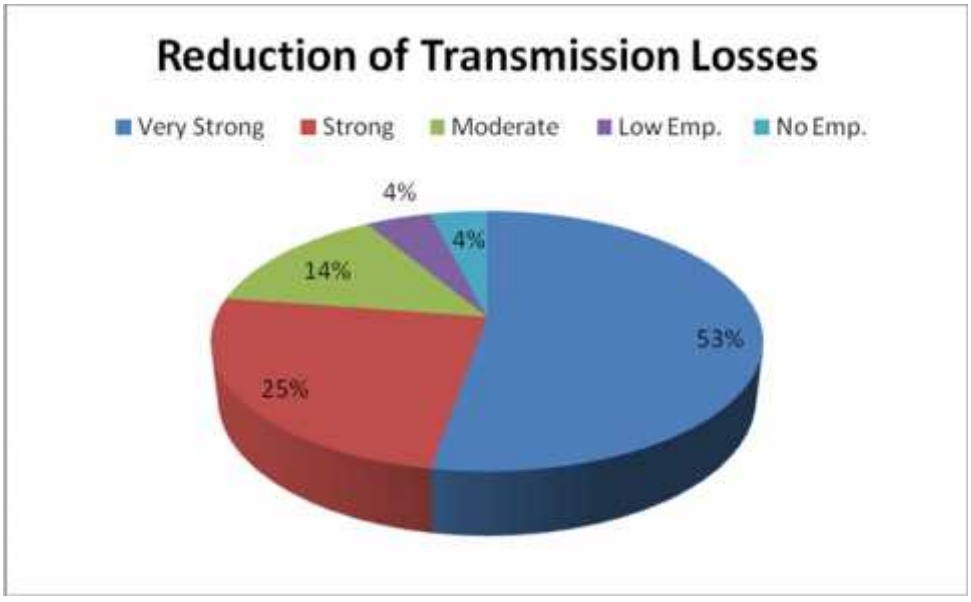
6.44 and Exhibit 6.41 reveal that 52.7 per cent of the respondents expressed ‘very strong emphasis’, 24.7 per cent ‘strong emphasis’, 14.0 per cent ‘moderate emphasis’, 4.6 per cent ‘low emphasis’, and 4.0 per cent ‘no emphasis’ respectively. From the above analysis it may be inferred that reduction of transmission losses is very important for Biomass power plants and needs to be incorporated in the functional strategies to be pursued by them.

Table 6.44 – Reduction of Transmission Losses

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	79	52.7	52.7	52.7
Strong	37	24.7	24.7	77.4
Moderate	21	14.0	14.0	91.4
Low Emp.	7	4.6	4.6	96.0
No Emp.	6	4.0	4.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.41 - Reduction of Transmission Losses



vii. Influencing Formulation of Govt. Policies through Associations

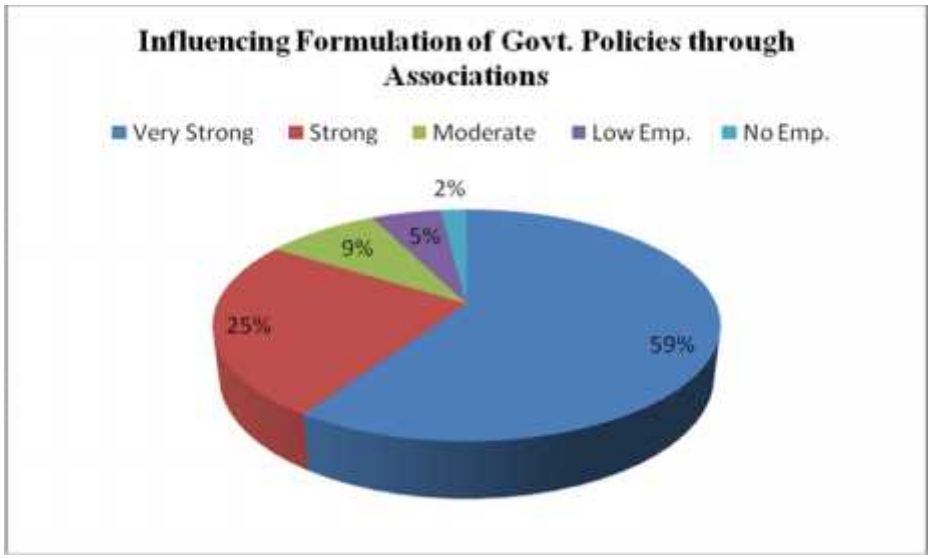
The professional bodies use various tactics and strategies to influence the policy makers to act in a particular way on various policy issues through lobbying, attempting to educate the supporters, and mobilizing other related associations on a particular issue. Most often the policy outcomes involve compromises among the interested groups and parties. Table 6.45 and Exhibit 6.42 depicts that 59.3 per cent of the respondents laid 'very strong emphasis', 24.7 per cent 'strong emphasis', 8.7 per cent 'moderate emphasis', 5.3 per cent 'low emphasis', and 2.0 per cent 'no emphasis' respectively. It may be inferred that Influencing formulation of Govt., Policies through Associations is of strategic importance and needs to be incorporated in the strategies of Biomass power plants.

Table 6.45 - Influencing Formulation of Govt. Policies through Associations

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	89	59.3	59.3	59.3
Strong	37	24.7	24.7	84
Moderate	13	8.7	8.7	92.7
Low Emp.	8	5.3	5.3	98
No Emp.	3	2	2	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.42 - Influencing Formulation of Govt. Policies through Associations



viii. Low cost of production

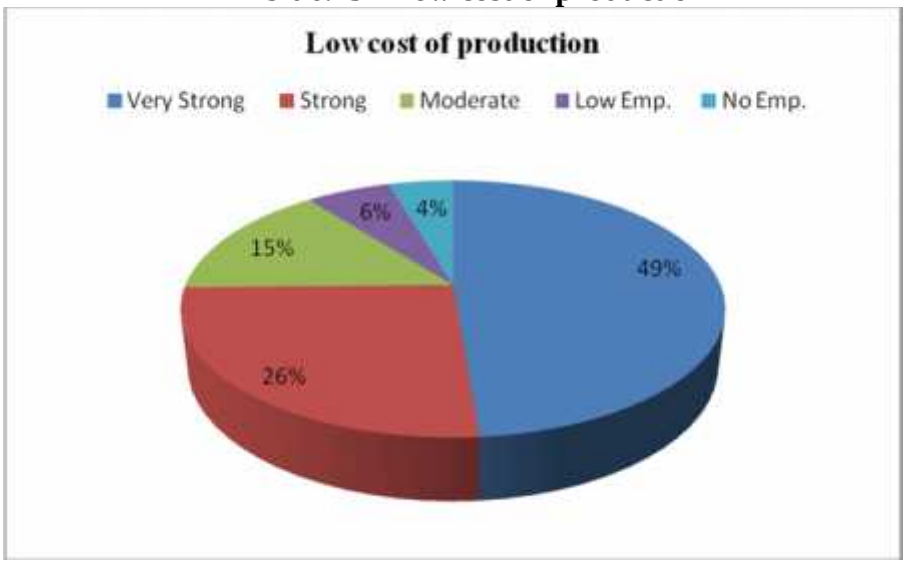
Low cost of production makes the plant more viable when compared to other plants in the industry as it facilitates cost leadership. In perfect competition, when the selling price is constant the firms enjoy the same percentage of profits along with other firms in the industry. But the firm which enjoys cost leadership can earn more profit compared to other firms in the industry. The results of the analysis as shown in Table 6.46 and Exhibit 6.43 reveal that 48.7 per cent of the respondents gave 'very strong emphasis', 26.0 per cent 'strong emphasis', 14.7 per cent 'moderate emphasis', 6.0 per cent 'low emphasis', and 4.6 per cent 'no emphasis' respectively. It may be inferred that low cost of production is a very important factor as it enhances the profitability of biomass power plants needs to be incorporated in the strategies of Biomass power plants.

Table 6.46 - Low cost of production

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	73	48.7	48.7	48.7
Strong	39	26	26	74.7
Moderate	22	14.7	14.7	89.4
Low Emp.	9	6	6	95.4
No Emp.	7	4.6	4.6	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.43 - Low cost of production



ix. Environment Management

Environment management encompasses a wide spectrum of issues like prevention of global warming, use of renewable sources of energy, meeting the demands of customers for eco-friendly products and complying statutory regulations. Environment Management initiatives provide the blue print for managements of Biomass power plants as regards the environmental requirements in respect of plant operations, local environment and interests of the community. The strategy integrates the procedures and processes of monitoring, summarizing and reporting the environmental performance to the stakeholders of a firm.

The results of the analysis as shown in Table 6.47 and Exhibit 6.44 reveal that 29.3 per cent of the respondents gave 'very strong emphasis', 14.0 per cent 'strong emphasis', 26.0 per cent 'moderate emphasis', 12.7 per cent 'low emphasis', and 18.0 per cent 'No emphasis' respectively. It may be inferred that environment management strategy is a strategic imperative for Biomass power plants as it has to ensure that the power produced by the plants is itself is clean power with low carbon emissions.

Table 6.47- Environment Management Strategies

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	44	29.3	29.3	29.3
Strong	21	14.0	14.0	43.3
Moderate	39	26.0	26.0	69.3
Low Emp.	19	12.7	12.7	82.0
No Emp.	27	18.0	18.0	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.44 - Environment Management Strategy

x. Training in Strategic Management

Familiarity with strategic management concepts and processes helps the employees identify with the vision and mission of the organization. This is one reason why the wavelength of the employees matches with that of the management so that the people in working in the plant can act most prudently and in line with the thought process of the management. For this to happen, employees should be trained in strategic management concepts, processes, tools and techniques. The results of the analysis as shown in Table 6.48 and Exhibit 6.45 reveal that 51.3 per cent of the respondents placed 'very strong emphasis', 29.3 per cent 'strong emphasis', 11.4 per cent 'moderate emphasis', 5.3 per cent 'low emphasis', and 2.7 per cent 'no emphasis' respectively. It may be inferred that training in strategic management concepts, tools and techniques is very important because it provides for continuous up-gradation of skills and needs to be incorporated in the strategies adopted by Biomass power plants.

Table 6.48 – Training in Strategic management

Emphasis	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Very Strong	77	51.3	51.3	51.3
Strong	44	29.3	29.3	80.6
Moderate	17	11.4	11.4	92
Low Emp.	8	5.3	5.3	97.3
No Emp.	4	2.7	2.7	100.0
Total	**150**	**100.0**	**100.0**	

Source: Computed from primary data.

Exhibit 6.45 - Training in Strategic management

All the above strategic imperatives need to be incorporated into appropriate functional strategies of biomass power plants and should be rigorously followed for viable operation of the plants and also for sustainable growth.

6.10 MOST PREFERRED STRATEGIES FOR BIOMASS POWER PLANTS

The functional strategies adopted in Biomass power plants are analyzed and their impact on the performance of Biomass power plants presented in this Chapter. This Chapter further validated the findings by way of statistical analysis i.e., correlation and regression analysis. It is observed from the results of inter-correlation among the strategies adopted by biomass power plants that they are positively correlated with each other. It is also observed from the regression analysis that the operations of the biomass power plants are significantly influenced by the functional strategies especially production strategy, financial strategy, and technology strategy, adopted by them. This Chapter further explained the need for additional corporate and business strategies to be pursued by Biomass power plants.

In this section, the views of the respondents were obtained regarding the most preferred strategies to be adopted and pursued by Biomass power plants. For this purpose, the mean and standard deviation scores of the strategies preferred by the respondents for biomass power plants are calculated and presented in Table 6.49. It is observed from the Table that "Backward Integration" and "Expansion" were given utmost priority by ranking them as no.1 (mean 4.10) and no.2 (mean 3.20). This indicates that the primary strategic option.

Table 6.49: Mean and Standard deviation Scores of Strategies preferred for Biomass power plant (Ranking)

Code	Strategy	Sample Mean	Sample Standard Deviation	Rank
	A. Corporate Strategies			
I_1	Backward integration	4.10	1.10	1
I_2	Expansion	3.20	0.98	2
I_3	Mergers and acquisitions	2.10	0.62	3
I_4	Joint ventures	1.09	0.51	4
I_5	Strategic alliances	1.29	0.67	5
	B. Business Strategies			
II_1	Low cost leadership	4.50	0.85	1
II_2	Differentiation	1.30	0.78	3
II_3	Focus	1.76	0.57	2
	C. Functional Strategies			
III_1	Production strategy	4.42	1.12	1
III_2	Marketing strategy	2.10	0.58	6
III_3	Finance strategy	3.98	0.76	2
III_4	HR Strategy	2.12	0.57	5
III_5	Technology strategy	3.85	0.78	3
III_6	Logistic strategy	2.29	0.75	4

Source: Computed from primary data.

Suggested for biomass power plants is expansion of the plant so that the installed capacity is increased to optimum levels for the long-term survival and growth of the plant.

The second key strategy suggested is "backward integration" to ensure adequate supply of raw material to the plant through setting up or acquisition of rice mills, etc. The third

strategy suggested is “diversification” (Mean 1.30) indicating that the biomass power plants may diversify into other related or unrelated areas so that the risk of running a single business is avoided. However, the respondents did not favour mergers and acquisitions, joint ventures and strategic alliances as Biomass power plants are small businesses and there is no need to, pursue the advanced corporate strategies.

As regards business strategies, the respondents gave preference to ‘low cost leadership’ (mean 4.50) because the strategies of differentiation and focus are not relevant to Biomass power plants.

Regarding functional strategies, production strategy, financial strategy and technology strategy are ranked 1st, 2nd and 3rd respectively indicating that superior production and financial management coupled with appropriate technology are the key to the success of Biomass power plants. The other key functional strategies emphasized are “logistics strategy” (ranked 4th) “HR strategy” (ranked 5th), and “marketing strategy (ranked 6th) in that order. In addition to the above functional strategies, the respondents indicated that all Biomass power plants should invariably incorporate the strategic imperatives as important components of functional strategies. These relate to strategic location of the plant, efficient procurement of raw materials, prudent production practices, cutting down costs of production, preventive maintenance practices etc. The survival and growth of biomass power plants is critically dependent on the above strategic imperatives and the strategies adopted by all biomass power plants should rigorously pursue them for long-term success.

On the basis of the above analysis, it may be summed up that it is important for biomass power plants to rigorously pursue expansion, backward integration, and low cost leadership in addition to the existing functional strategies. Further, the functional strategies may be given increased thrust by incorporating the strategic imperatives mentioned above to improve the long-term performance and success of Biomass power plants.

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CHAPTER -VII
SUMMARY AND SUGGESTIONS

Energy is the most vital factor of economic development and social transformation for all developed and developing countries. Without readily available cheaper energy, the great strides taken by the society in industry, transport and agriculture would have been unimaginable. Among the commercial forms of energy, electricity is the most convenient, versatile and relatively cheap source. Electricity is a basic industry on which the economic and social development depends to a great extent. It is a prime mover of the economy and brings the greatest benefit and good to mankind. Electricity is capable of being put to multifarious uses to meet all human needs. The infrastructure required for industrial development can also be built up only on sound and extensive network of electricity supply. Application of electricity in different fields of operations increases productivity and reduces human drudgery. In fact, electricity is the motive force for all material progress and can trigger economic development for heightening the foundation of an economy.

As development of power sector is the key to the economic development, the government has been giving adequate priority ever since the process of planned development began in 1950. The Power Sector has been getting 18-20 per cent of the total Public Sector outlay in initial plan periods. Remarkable growth and progress have led to extensive use of electricity in all the sectors of economy in the successive Five Years Plans. Though the Indian power sector has achieved substantial growth during the post-independence era, the sector has been sick with serious functional problems during the past few decades. India, today, has an installed capacity of 1, 59,398 MW. Despite the recent slowdown, the country experienced a peak deficit of 12 per cent during 2010-11. Power is one area of infrastructure where India lags far behind when compared to other developing countries. India's per capita consumption of power stands at 706 kWh. As compared to this, the per capita consumption in China and US is 2,060 kWh and 13515 kWh respectively.

Electricity is generated from various sources such as hydro, thermal, nuclear and non-conventional sources viz., wind, solar, biomass, etc. In spite of substantial growth in

electricity generation over several decades, it is heartening to note that the demand is always higher than the supply of electricity. In the light of the shortage of electricity, the Government of India has initiated several steps to increase power generation by providing adequate financial allocations in the successive Five Year Plans.

Most of the electricity is produced from non-renewable fossil fuels, confronting human community with imminent shortage and exhaustion of these feed stocks. That apart, the use of these fuels is fast leading to worst kind of pollution, greenhouse gasses, climate change, and global warming. But biomass power generation is CO_2 neutral, since only a minimal amount of carbon is emitted during combustion. Government of India supports renewable energy generation like biomass power since carbon emissions are low from such operations and they reduce dependence on non-renewable resources.

Biomass is one of the important energy sources of India as it offers many benefits. It is renewable, widely available, carbon-neutral and has the potential to provide significant employment in the rural areas. Biomass is also capable of providing firm energy. The agricultural wastes which were earlier being burnt in the fields are now being effectively utilized for producing electricity in Biomass power plants. Farmers collect the agricultural waste from their fields and sell it to the power plants, for which they realize considerable income on such wastes. Power generation from these agricultural wastes provides employment, direct as well as indirect, to rural population. They are eco-friendly and also contributing to optimum utilization of resources. Biomass power plants will not pollute the atmosphere. They are helping grid stabilization, improve voltages in rural areas and reduce burden on thermal and hydel power plants. The Government is encouraging the renewable power as there is a huge shortage of power all over the country.

Biomass power production gives social, economical and environmental benefits to the community, particularly where agricultural waste like paddy husk, top ends of sugarcane stalks, pulse husk, ground nut shells, side branches of orchard plantations, maize cobs, palm oil bunches, etc., and any other agricultural and forest waste collected after the main

produce harvest are abundantly available. The current availability of biomass in India is estimated at about 500 million metric tons per year. Studies have estimated surplus biomass availability at about 120 – 150 million metric tons per annum covering agricultural and forestry residues corresponding to a potential of about 18,000 MW.

Energy from Biomass can make a tremendous contribution towards sustainable power supply, and as such, Biomass power generation in Andhra Pradesh has gained momentum from 1996. The Central Government as well as the Govt. of Andhra Pradesh has been promoting electricity generation from Biomass as a means of full exploitation of its inherent energy value and the abundance availability of Biomass material available in the State.

The Ministry of New and Renewable Energy and the Govt. of Andhra Pradesh have encouraged establishment of Biomass power plants across the State which use technologies for generation of electricity through combustion using boiler and turbine and gasification, using Gasifier and producer gas engines. Taking advantage of the government initiatives, 34 Biomass power plants have come up in various districts in Andhra Pradesh with a combined installed capacity of 202.75 MW. At present, however, out of the total Biomass power plants in Andhra Pradesh, six plants are in full operation throughout the year and 23 power plants are operating for 3 to 6 months due to non-availability of continuous supply of raw material.

It is heartening to note that as many as five Biomass power plants are closed down as their functioning has become unviable due to financial and other managerial problems. One of the main reasons for not having financial viability is steep rise in raw material prices and huge gap between input cost and the tariff being offered by APTRANSCO which purchases the power generated by the Biomass power plants. For example, to generate one unit of power, the requirement of husk is 1.7 to 1.8 kg and at present the price of husk is Rs. 4 per kg.

There were no restrictions on the sale of power in the initial days but the situation changed after the APTRANSCO and APSERC entered the scene and made power purchase agreements mandatory. Unfortunately in the year 2004, APTRANSCO has reviewed the tariff and slashed down the price per unit from Rs. 3.48 to Rs. 2.79. This decision had an adverse impact on the financial viability of all the Biomass power plants in general and those which are already facing financial problems resulting in total closure of five Biomass power plants. Even though the electrical power shortage is very high in Andhra Pradesh because of APTRANSCO's decision, many Biomass power plants became financially unviable which has a cascading effect on other industries facing acute shortage of power.

The underlying problem appears to be an overall lack of strategic management beginning with an inability to plan a strategy to efficiently manage the enterprise and ending with a failure to develop a system of controls to keep track of performance. Often the small entrepreneurs like promoters of Biomass power plants keep themselves busy with only operational problems of the business and do not devote enough time for thinking ahead to setting clearly the directions for their business. This result in unviable operation of the enterprise coupled with technical and financial problems which ultimately results in the closure of business.

In today's global competitive environment, any business, large or small, that is not thinking and acting strategically is extremely vulnerable. Every business is exposed to the forces of a rapidly changing competitive environment and in the future small business executives can expect even greater uncertainty. From sweeping economic changes and rapid technological advances to more intense competition and newly emerging global markets, the business environment has become more turbulent and challenging to business owners. Entrepreneurs must develop plans to boldly face the challenges posed by the dynamic business environment and profitably avail opportunities they create. To be successful, entrepreneurs can no longer do things in the way they have always done them. Consequently the successful small business manager needs a powerful weapon to cope with such a hostile environment and the weapon can be none other than the strategic

management. Strategic Management involves developing a game plan to guide the company as it strives to accomplish its vision, mission, goals and objectives and to keep it from straying off its desired course. The idea is to give the owner a blueprint for matching the company's strengths and weaknesses to the opportunities and threats in the environment.

A strategy enables an organization to balance its resources and capabilities to the needs of the external environment in order to achieve competitive advantage. In such fast-paced markets, to catch up with competition, organizations need to seize opportunities, capitalize on strengths, overcome weaknesses and counter threats. Therefore, it is imperative for organizations to constantly be vigilant and formulate and implement strategies resulting in long-lasting survival and success of the organization. Many companies have modified their management philosophy from 'traditional management' to 'strategic management'. The study of strategic management has since developed in the area that attempts to address the question of how firms make strategies, how they inter-relate them and how they ultimately implement them.

The strategic management process involves three stages namely, strategy formulation, strategy implementation, and strategy evaluation. Strategy formulation includes developing a vision and mission, identifying an organization's external opportunities and threats, determining internal strengths and weaknesses, establishing long-term objectives, generating alternative strategies, and choosing particular strategies to pursue. Strategy implementation requires a firm to establish annual objectives, devise policies, motivate employees, and allocate resources so that formulated strategies can be implemented. Strategy evaluation involves measuring the performance and taking necessary corrective actions. In short, strategic management is about envisioning the future and realizing it.

In the present context, therefore, strategic management has become a part of every successful business enterprise and contributed to the long-term growth of the company. Research indicates that it helps the firm to be more proactive than reactive in shaping its own future. It serves as a road map for the firm. It allows managers to take decisions

concerning the future with a greater awareness of their implications. Strategic planning offers a systematic means of coping with uncertainty and adapting to change in an increasingly competitive environment. Hence, there is a great need for strategic management in all enterprises. Whether the business managers are pro-active or reactive in their decisions, they all recognize strategic management as an integral part of business activity.

In the present study, an attempt has been made to examine the strategic management process, the strategies adopted and their impact on the organizational performance of the select bio-mass power plants in the state of Andhra Pradesh.

Need for the Present Study

In many quarters, it is felt that there is a dearth of research on management of Biomass power plants in the academic literature. The primary purpose of the present study is to explore the concept of strategic management, identify the most important factors that contributed to the success of some Biomass power plants in Andhra Pradesh and suggest measures to be adopted by other power plants which are functioning for limited periods and those which became financially unviable for achieving sustainable growth of power industry. The present study is necessitated specifically by the following reasons:

Economic liberalization in India has created many opportunities for the growth of small manufacturing organizations like Biomass power plants, but at the same time has also thrown many challenges. The major reasons for sickness in small manufacturing organizations like Biomass power plants are inadequate management, non-availability of raw material, un-remunerative tariff policies of the Government, infrastructural bottlenecks, inadequate finance and gaps in entrepreneurial skills.

The review of literature clearly indicates that the concept of strategic management in small enterprises has been able to significantly impact their financial performance and has evoked a great deal of interest among many scholars and industry leaders. However,

it has been observed that most of the studies are conducted abroad and there are no doctoral research studies available in India focusing on the strategic management in Biomass power plants in India.

The review of literature also indicates that there is no professional management in Biomass power plants and very little awareness about the strategic management practices. It is observed that plants founded on strong vision, mission and other strategic practices are more likely to succeed. Further, if the plants in vanguard are successful, the next generation of Biomass entrepreneurs will find little difficulty in managing their plants successfully. An area which requires exploration is the link between diligent practice of strategic management and plant's success. Till now, there is no study which proceeded in this direction. A study of this kind will be seminal and useful to the posterity.

Further, during the discussions held by the researcher with some of the executives in the Biomass power plants and the office-bearers of the Biomass Energy Developers Association in Andhra Pradesh, it was indicated that there is an immediate need to study strategic management practices adopted by the successfully functioning biomass power plants in a holistic manner and suggest additional strategies to be adopted for the revival of Biomass industry in the state of Andhra Pradesh based on an empirical study. This would enable the managers of the unviable Biomass power plants to think about ways and means for their revival and healthy growth of biomass industry in India in general and Andhra Pradesh in particular.

There is, therefore, a need to study the strategic management in Biomass power plants and analyze the factors that influence their success and suggest additional measures for sustainable growth of Biomass power plants in Andhra Pradesh. Hence, there is a need to study and evaluate how far the measures and strategies adopted by the successful Biomass power plants in Andhra Pradesh are appropriate in the present context and what more needs to be done to improve functioning of Biomass power plants by adopting additional strategic initiatives to overcome the problem of non-availability of raw

materials, reduction in transport of raw materials, to get fair price for the power generated, etc.

There is no reported research on strategic management process, competitive strategies and performance of Biomass power plants in Andhra Pradesh, although such businesses form a major part of the private sector of the Andhra Pradesh economy. There is, therefore, a research gap and the need for the present study felt. This study is an attempt to fill the void through a study of strategic management practices in select Biomass power plants of Andhra Pradesh.

Keeping the above in view, an attempt has been made in the present study to examine the strategic management practices adopted in selected Biomass power plants in Andhra Pradesh which are functioning successfully over a period of time. The present study also suggests additional strategic measures and initiatives that should be taken by these plants to further improve their performance in all respects. The present study is expected to contribute to the increase of the overall productivity and profitability of the Biomass power plants on the one hand, and help the defunct power plants in their revival, on the other.

By looking at the relationship between strategy process and performance, the present study makes contribution to the literature in two ways: Firstly, to learn more about strategic management process and competitive strategies of small businesses. Eventually, this might also add to a better knowledge of the micro processes of organizational strategy development. Secondly, it contributes to the literature on the relationship between strategy process and performance, and functional strategies and performance in small enterprises like Biomass power plants.

Objectives of the Study

The primary objective is to study the strategic management in Biomass power plants and the factors contributed the success of selected Biomass plants. The study attempts to

suggest additional measures that can be taken for achieving increased productivity, organizational performance and profitability. This diagnostic study is expected to be useful to the Biomass industry in India in general and Biomass power plants in Andhra Pradesh in particular. The following are the specific objectives of the study:

1. To review the development and policy framework of Biomass power plants in Andhra Pradesh.
2. To identify the extent of usage of strategic management practices by select Biomass power plants under study and to capture the management motivations for adopting strategic management.
3. To know the extent of usage of six components of strategic management process under study and the emphasis given to various components.
4. To assess the functional strategies adopted in biomass power plants under study and identify the emphasis given to various components of functional strategies.
5. To ascertain the views of respondents regarding the most preferred strategies for Biomass power plants.
6. To offer suggestions, wherever necessary, regarding adoption of additional strategies by Biomass power plants to improve their overall performance.

Hypotheses of the Study

Based on the empirical studies reviewed, the following hypotheses are formulated to study strategic management in select Biomass power plants under study.

Hypothesis-(H_1): Adoption of strategic management

1. The adoption level of strategic management practices is high in Biomass power plants.

or

2. The adoption level of strategic management practices is moderate in Biomass power plants.

Hypothesis-(H_2): Strategic Management Process

a) Biomass power plants use all the six components of strategic management process as per Wheelen & Hunger (2004) framework, but the degree of emphasis placed on each component varies significantly.

or

b) Biomass power plants do not use all the six components of strategic management process as per Wheelen & Hunger (2004) framework, and the degree of emphasis placed on each component does not vary significantly.

Hypothesis (H_3): Competitive and Cooperative Strategies

a) Comprehensive functional strategies were adopted by Biomass power plants which have a significant impact on their performance.

or

b) Comprehensive functional strategies were not adopted by Biomass power plants and they have little or no impact on their performance.

Hypothesis (H_4): Critical Success Factors

a) Strategic location of the plant and tight cost control are the critical success factors of Biomass power plants.

or

b) Strategic location of the plant and tight cost control are not the critical success factors of Biomass power plants.

Research Methodology and Sampling

An attempt has been made to explain the research methodology adopted in the present study. In general terms, the design of the study can be classified under the label **"**Quantitative study" within the general approach. The objective is to gain an

understanding of the key variables that constitute how a business enterprise practises strategic management.

Sample Design

There are only six Biomass power plants which are functioning successfully throughout the year whereas 23 plants were functioning for three to six months in a year while the remaining 5 plants were closed down due to financial and managerial problems. A study conducted by the researcher revealed that the aforesaid six biomass power plants were functioning successfully throughout the year and making sizeable profits by adopting strategic management practices. Further, it is found that these plants follow a systematic approach to strategy formulation, implementation and evaluation and control. Hence, the following six Biomass power plants are selected for detailed study: 1. Rithwik Power Projects Private Limited, Khammam District, 2. Satyamaharshi Power Corporation Limited, Guntur District, 3. Greenko Energies Private Limited, Kadapa District, 4. Roshni Powertech Private Limited, Krishna District, 5. Varam Power Projects Private Limited, Srikakulam District, 6. Shalivahana Green Energies Limited, Adilabad District. The plants which are functioning for a limited period in a year and those which are totally closed down are not studied as there is no scope to examine the use of strategic management practices in these power plants.

At the first stage, a list of the promoters, executives and supervisors of select plants was obtained. While the total population of the promoters, executives and supervisors of select plants is 426, there are many other designations among technical staff which comprise of very junior level employees viz., Technical Assistant, Junior Assistants, etc. The junior level staff are excluded from the sample for this study because they hardly come in contact with strategic issues of Biomass power plants. An important aspect to be noted here is that the Biomass power industry is labor intensive, requiring very limited skilled manpower. The ability of respondents drawn from unskilled workers is limited in understanding the contents of the questionnaire and hence they are excluded in designing the sample.

The researcher having interacted with the senior executives of the power plants and some of the knowledgeable persons in Biomass power industry felt that it is desirable not to include executives having less than three years of experience in this industry in the sample as they have less exposure to strategic issues of the industry. At the second stage, therefore, all the executives and supervisors having less than three years and less experience in Biomass industry are excluded while designing the size of the sample. For the purpose of the present study, therefore, 25 respondents from the promoters, executives and supervisors in each Biomass power plant under study having at least three years' experience in the industry have been taken as the sample for the study using quota sampling technique. Thus a total sample of 150 respondents was used for the purpose of this study.

Preparation of the Interview Schedule

The researcher has collected information from the respondents consisting of promoters, executives and supervisors of the selected Biomass power plants by using a detailed interview schedule. Questions of the interview schedule were carefully framed and arranged for the purpose of taking each respondent through the same sequence, and asking each respondent the same questions.

Further, the questions of the interview schedule were prepared based on the literature collected on issues pertaining to the strategic management process and the strategies adopted by small businesses and the theoretical framework that has been generated from the literature. Specific questions were included under each component mentioned above to elicit the information and perception on strategic management practices adopted by the sample units from the selected respondents. While finalizing the questions the researcher had interacted with senior professors in GITAM University, Andhra University, Jawaharlal Nehru Technological University, (JNTU), Hyderabad and also the executives in the selected Biomass power plants.

Along with obtaining data from interview process, data was also obtained from direct observations of the organization's current activities and from the documents prepared by the organization. The researcher, in the role of an observer, attended some meetings between the owners and financial institutions, (e.g. Review Meetings, Conferences & Seminars), owners and district officials (e.g. Entrepreneur Development Programmes, Industry wise Review Meetings, Industrial Policy initiatives, etc.). Observations of these formal meetings facilitated a better understanding of how decisions were made and implemented in Biomass power plants. For the purpose of pre-testing the interview schedule, a pilot study was conducted among 30 respondents selected from promoters, executives and supervisors.

Data Collection

The study is based on both primary and secondary data. The developments and prospects of Biomass power industry and the strategies adopted by them all over the world was of special interest to the researcher for over 25 years and copies of articles appearing in the related journals both Indian and international on topics of interest were reviewed.

Primary Data: As already mentioned, the primary data was collected by interview method through a structured schedule after necessary pilot study. The interview schedule contained five parts consisting of about 128 questions. In addition to this, informal discussions were held with Biomass Energy Developers Association office bearers and other experts in the field.

Secondary Data: The study is also based on the secondary data obtained from different sources. For analytical purpose, both official sources of data from the organization and various other databases are used. Secondary data in respect of production, demand and consumption of Biomass power and other relevant information were obtained from Ministry of Central Electricity Regulatory Commission, New & Renewable Energy Development Corporation (NEDCAP), the Annual Reports published by the Ministry of New and Renewable Energy (MNRE), the Annual Reports and the select plants are also important sources of secondary data. The major publications referred to in this study

include, Bulletins of Indian Biomass Association, annual reports of the Ministry, annual reports of select plants, economic surveys, books and other publications.

Thus, multiple sources of data were used in this study i.e. Interview based data, documented-data and observation based data. The use of such multiple sources of data enhances the validity of the findings and enabled the researcher to crosscheck the information obtained. Reliability is achieved when it is assured that the operations involved in the study can be repeated to arrive at the same findings (Miller and Cardinal 1994; Gibb and Scott 1985; Yin 1984).

In this study, an attempt has been made to enhance the reliability and validity of the data in two ways. *First*, during data collection, the facts, the conceptual labels used to describe these facts; the researcher's initial interpretations of what was observed and the emerging hypothesis were continuously crosschecked during data collection. *Second***,** a structured questionnaire was used to limit the variation among interviews.

Data Analysis

As the study was based on both primary and secondary data, the primary data has been collected from the promoters, executives and supervisors of biomass power plants under study, while the secondary data was collected from the Biomass power plants, government and other related agencies. The data and information thus collected is analyzed and interpreted with the help of statistical tools. The interview data content was analyzed using *SYSTAT and SPSS 20* statistical packages. For testing the null hypothesis, correlation, t-test and variance analysis, etc., have been used to know the respondent perceptions regarding the strategic management practices adopted. The results are measured with the help of the table values so as to find out the levels of significance.

To arrive at the most common motivating factors for adopting strategic management practices, Garret Ranking Method was used. This method gives a combined mean score for each of the choices so that the one with highest mean value is taken as the most

preferred option, and the next highest is taken as the second most preferred option, and the rest in that order.

A corresponding score for each of the percentages is worked out with the help of the Garrett Table, and with such scores, a mean score is calculated for each option; the one with the highest mean is taken as the most preferred option. This method identifies the most preferred option among a range of options indicated by the sample respondents. Further, to understand the importance of each of the range of options, a set of choice alternatives is given as follows.

Five-point scale was used with a set of choice alternatives viz., “very strong emphasis”, “strong emphasis”, “moderate emphasis”, “low emphasis” and “no emphasis”. It is needless to say that their place in the list indicates their priority; for example, “very strong emphasis”, represents the highest priority and “strong emphasis”, the next highest, and “low emphasis” and “no emphasis” indicate the lowest priority while “moderate emphasis” indicates the middle level priority. These labels are used to understand the emphasis given to various elements of functional strategies. The frequencies of responses are taken and plotted on a pie-chart. The one with the highest frequency is understood as carrying the most dominant place in the strategic management process or functional strategy concerned.

The relationship between performance and strategic management components and also the relationship between strategies and performance were calculated by using regression analysis. Correlations among elements of strategic management process, strategies adopted by the plants and performance measures were compiled and presented in respective chapters.

Presentation of the Study

The study is presented in seven chapters. The framework of the study is given below:

Chapter 1 is introductory in nature. In this chapter an overview of Biomass power industry is presented. Further, it describes briefly the challenging role of management in business enterprises, the concept of strategy, the meaning and significance of strategic management in Biomass power plants. Chapter 2 describes briefly the present status and the impact of Government policies on the Biomass power industry in the state of Andhra Pradesh. Chapter 3 reviews the literature on Biomass power plants and also the strategic management practices in business enterprises in India and abroad. Chapter 4 presents the need for the present study, specific objectives and hypotheses of the study, research methodology and sampling, and limitations of the study. Chapter 5 consists of three sections. The first section presents a profile of the select Biomass power plants under study, the second section deals with use of strategic management practices in Biomass power plants and the third section examines the components of strategic management process adopted by Biomass power plants and also the degree of emphasis placed on each component and element of strategic management process. Chapter 6 analyzes the functional strategies such as production strategy, marketing strategy, financial strategy, HR strategy, technological strategy and logistic strategy being followed in the Biomass power plants. This chapter also examines the correlation and regression between the strategic management components and other variables. Chapter 7 presents a summary of the study and the major findings together with suggestions for further improvement of Biomass power plants using strategic management practices. This Chapter also presents the scope for further research.

Limitations of the Study

The researcher has taken every care in designing the research work in consultation with the research guide, resource persons from reputed universities and also interacted with top level executives and promoters of Biomass power plants not only in the select plants but also in other related professional bodies and governmental agencies. Having a good length of executive experience at various levels in the plants, the researcher spent considerable amount of time in obtaining secondary data and also collecting primary data from the promoters, executives and supervisors. Even though every effort was made to

enrich the study with the required data and analysis, it is humbly submitted that the study is not free from limitations. The study has the following limitations:

First, as in any strategic management study, a limited number of variables are examined. There are many other variables such as strategic leadership, strategy-supportive culture, information systems, reward systems, etc., which the researcher could not cover them in the study either due to non-availability of the relevant data or because some of them are confidential in nature which the respondents gently refused to provide such data. *Second,* Many Biomass power plants did not provide financial information hence this study relied on subjective measures of key variables. Although efforts were taken to guard against biased responses, this study is subjected to the potential weaknesses associated with the use of perceptual data. *Third,* the secondary data has become a critical input in the study which was collected not only from the Biomass power plants but also from various other sources which include the Ministry of New & Renewable Energy and other sources. While using the required data drawn from various sources, it is observed that there are some variations in the data collected from different sources. While computing the data under the same category, slight variations are overlooked in the analysis of data. However, it is felt that such variations may not have much impact on the analysis and the working out the trends. *Fourth,* this being a nascent industry in India, the promoters, executives and supervisors are not as well-versed with strategic management as they are with their day to day work. Hence, it is possible that they have given unengaged responses or socially desirable responses. So, this is a major limitation which restricts applicability of the findings to the electricity sector in general.

7.2 MAJOR FINDINGS

The major findings of the study are presented below:

1. The results of the analysis on adoption of strategic management practices revealed that most of the Biomass power plants under study have adopted strategic management practices though the degree of the level of adoption varies from one plant to the other. As nearly 51.33 per cent of the respondents felt that the level of adoption of strategic

management practices in Biomass power plants is 'moderate', there is ample scope to increase the efficiency of Biomass power plants by enhancing the use of strategic management practices by them. This rejects the Hypothesis (H_1 - a) that the adoption level of strategic management practices is 'high' in Biomass power plants and proves the Hypothesis (H_1 - b) that the adoption level of strategic management practices is moderate in Biomass power plants.

2. The study also revealed that the majority (75.47 per cent) of the respondents felt that the 'strategic location of the plant' is the most important core competency of biomass power plants which enables the plant to conveniently procure adequate quantities of raw materials locally, secure proximity to the grid/sub-station besides ensuring water availability and adequate supply of skilled manpower. The other core competencies indicated by the respondents include 'organic leadership style' (74.78 per cent) and 'efficient production and maintenance operations' (61.63 per cent). Interaction with the managements of some of the biomass power plants revealed that these core competencies enabled biomass power plants to produce power with the least cost, which in turn, helped them to run the plant throughout the year and export appreciable quantities of electricity to the State Grid. Thus, the study revealed that core competencies provided distinctive advantage to the Biomass power plants by way of sustained financial viability besides helping them to make a significant contribution in meeting the energy needs of the State. The study also revealed that 'tight cost control' (70.03), 'low raw material costs' (62.98) and 'low labor costs' (62.0) are the most important critical success factors of biomass power industry. This analysis supports Hypothesis (H_4 - a) that 'strategic location of the plant' and 'tight cost control' are the critical success factors of Biomass power plants.

3. The results of the analysis of management motivations for adoption of strategic management practices revealed that 'facilitation of cost control' (86.0), 'uncertainty reduction' (71.0), 'measurement facilitation' (69.7), 'significant improvement of performance' (58.3) and 'minimization of resistance to change' (54.0) are the predominant factors that motivated the Biomass power plants to adopt strategic management practices.

4. The results of the analysis with regard to the components of strategic management process revealed that the Biomass power plants under study followed all the six components as suggested in Wheelen & Hunger's framework, though the emphasis placed on different components and elements varied. It is observed from the above analysis that the respondents placed significantly greater emphasis (higher mean values) on vision, mission and objective setting, strategy formulation and external and internal analysis, strategy evaluation and control whereas comparatively less emphasis was placed on strategy implementation, degree of use of planning tools and involvement of personnel in the strategic management process. The inferences drawn in this analysis proved Hypothesis (H_2 - a) that Biomass power plants use all the six components of strategic management process as per Wheelen & Hunger's framework though the degree of emphasis placed on different components and elements varied significantly.

5. The salient features and components of key functional strategies adopted in Biomass power plants under study were analyzed and the emphasis placed on the components was examined on the basis of opinions gathered from the respondents and also interaction with the experts in the field of Biomass power plants. The results of the analysis of the Production Strategy adopted in Biomass power plants revealed that high priority was accorded to 'plant layout' (81.4 per cent), 'capacity utilization' (78.6 per cent), 'efficiency of raw material utilization' (78.6 per cent), production scheduling (75.3 per cent), inventory planning (72 per cent), and 'plant maintenance' (69.3 per cent). However, areas like waste control and material handling received less emphasis even though, in actual practice, the managements of biomass power plants gave adequate importance to these areas also to reduce the overall cost of production. The analysis further revealed that the Production strategy had helped to improve the performance of Biomass power plants by ensuring smooth rollout of output by putting in order the plant, workforce and raw material. The plants had streamlined their operations and showed a high overall performance as is attested by production strategy's regression coefficient which was 0.404. In fact, of all the functional strategies, production strategy had contributed the most to the overall performance of the plants under study.

6. An analysis of different components of the Financial Strategy adopted in Biomass power plants revealed that high priority was accorded to capital structure planning (82 per cent), cash flow planning (71.3 per cent), capital expenditure planning (69.3 per cent), working capital planning (69.3 per cent), and profit planning (67.3 per cent). The basic reason for this high emphasis, as gathered during interaction with experts, was the investments and the accompanying costs involved therein needed more systematic financial planning by Biomass power plants. Further, rising costs of raw materials, increased wages and other inputs were the important factors which necessitated high priority to profit planning, working capital planning, etc. However, taxation planning received less emphasis in the financial planning process of Biomass power plants though it is intimately related to profit planning. The analysis revealed that the financial strategy was the second most important strategy that contributed to the overall performance of the plants by helping them to secure both short-term and long- term purposes, and putting it to the best use for viable functioning of the plant. According to the study, the contribution of Financial Strategy to the overall performance was significant as was attested by the regression coefficient of 0.355.

7. The analysis relating to various components of HR strategy revealed that high priority was accorded to HR planning (78.7 per cent), career planning (72 per cent), planning for improvement in morale and motivation (71.3 per cent), recruitment planning (64.7 per cent) and employee relations (59.3 per cent). The principal reasons for this focused emphasis, as noted during interaction with the experts of Biomass power plants, were small size of the organization, shortage of skilled manpower, and high competitiveness leading to increased thrust on productivity. The analysis also revealed that planning for training and development activities, succession planning and employee participation received only moderate or low priority from the respondents. The researcher disagrees with the opinion of the respondents in this regard because, as revealed in interactions with the experts of Biomass power plants, adequate importance was given to training and development activities of employees. The analysis further revealed that the contribution of HRM strategy was moderately significant to the overall performance of the plant. Acquisition of right workforce, training, paying them the right compensation, and retaining them, etc., made some difference to the smooth functioning of Biomass power

plants. The regression coefficient of HRM was 0.245; importantly, this beta was significant, since the p-value was <0.05.

8. The analysis of components of Technology Strategy revealed that high priority was given to judicious selection of technology (64.7 per cent) and technology up-gradation (52.0 per cent), while replacement of old technology and exploitation of adopted technology to the maximum were given less priority. As is evident, both judicious selection of technology and its up-gradation had been supporting the operations of the Biomass power plants in producing electricity from biomass with less production break-downs and hold-ups. Technology, which encompass all the methods and processes that a plant uses in all of its operations, is an important factor, and a wrong choice of technologies available on the shelves might foul up all the plans. It is needless to say that good technology gives a competitive edge and has the potential to reduce overall operating costs. As per the secondary data obtained, most of the Biomass power plants under study were commissioned between 2002 and 2004 and the need for improving the health of the equipment was acutely felt. Further, due to advancements in Biomass power technology, there was a need to adopt latest technology in the plants as per the changing needs. From the above analysis, it was found that Technology Strategy adopted in Biomass power plants needs to be recast so that latest technology is adopted to improve the quality of product and reduce costs in several production processes of Biomass power plants. The contribution of Technology Strategy to the overall performance, according to this study, was significant as attested by the beta value of 0.210 and the corresponding p-value of <0.05.

9. The analysis of Logistics Strategy revealed that high priority was given to both receipt of raw materials (78.6 per cent) and inward transportation (72.7 per cent) as they are the two important thrust areas of the Logistics Strategy. How material is transported into and out of premises and where it is kept for use has the potential to improve the overall efficiency. From this analysis, it was found that the Logistics Strategy adopted in Biomass power plants contained the most important components which had been helping the plants to reduce the transportation costs and production costs thereby improving the

financial position of Biomass power plants. The contribution of Logistics Strategy with a regression of coefficient of 0.201 was also significant.

10. The analysis of the Marketing Strategy adopted in Biomass power plants revealed that both the important aspects of distribution system (71.4 per cent) and market information system (70.6 per cent) received high priority. Components like product mix decisions, pricing policies, promotion and advertising, etc., are not applicable to Biomass power plants as the power produced is purchased by the State government on the basis of the tariff rates fixed by APERC from time to time. The impact of Marketing Strategy on overall performance was also found to be insignificant. The regression coefficient was 0.116 and the corresponding p-value was >0.05. It is evident from the study that there was no impact of marketing strategy on the overall performance. Since there is a monopoly in purchase of power by a single buyer, there is no point in expecting a significant relationship between this strategy and overall performance.

11. On the whole, the analysis revealed that most of the important components of functional strategies were given due emphasis and that they had a significant impact on the performance of Biomass power plants. This finding supports Hypothesis (H_3 - a) that comprehensive functional strategies have been adopted by Biomass power plants which have significant impact on their performance.

12. The significant results of the inter-correlation of the functional strategies adopted by Biomass power plants further revealed that they are all positively correlated with each other. There is high correlation between production and technology strategies, production and financial strategies, production and marketing strategies, HR and production strategy, etc.

13. Growth strategies are the most widely pursued corporate strategies by small businesses. Organizations that do not grow are pushed out of their business arenas by competitors and other new entrants. Further, growth helps the firms to create economies of scale and scope, serve as a motivational force for managers, increase the prestige of

firms, bestow advantages of experience curve and lead to many social benefits. As regards the growth strategies to be adopted by Biomass power plants, majority of the respondents (52 per cent) gave high priority to expansion of the plant so that the installed capacity is increased to optimum levels for the long-term survival and growth of the plant. From the above analysis, it was found that expansion strategy is strongly recommended for Biomass power plants as it helps in achieving the economies of scale.

14. The second key corporate strategy suggested for Biomass power plants was 'backward integration' to ensure adequate supply of raw material to the plant through setting up or acquisition of rice mills, etc. Backward integration refers to ownership or increased control of raw materials or inputs. In the long run, non-availability of biomass raw material would be a serious handicap for Biomass power plants. The analysis revealed that adoption of backward integration by Biomass power plants was very much essential for ensuring continued supply of raw material and reduction of overall costs.

15. Though diversification strategies like mergers and acquisitions facilitate the combination of two or more organizations to take advantage of synergy of businesses which will greatly help them in the elimination of competition, and rapid growth, the study revealed that majority of respondents did not prefer mergers and acquisitions as Biomass power industry consists of plants are of smaller scale and so diversification is not much of relevance to them.

16. The study revealed that there are certain strategic factors that determine the successful operations of Biomass power plants and ensure their long-term success in the industry. These factors refer to as strategic imperative that every Biomass power plant should adopt. The analysis revealed that the strategic imperatives include strategic location of the plant, cost-effective procurement of raw materials, prudent production practices, cutting down costs of transportation, etc. It is suggested that all Biomass power plants may give sufficient thrust to these strategic imperatives in the strategies followed by them.

7.3 SUGGESTIONS

Based on the analysis and interpretation of the data collected from the promoters, executives and supervisors of the Biomass power plants and interaction with experts in the field of Biomass power plants, the following suggestions are offered:

1. The organization structure of the biomass power plants under study varied from plant to plant. Further, it was also observed that the hierarchy and span of control are not clearly defined. It was also felt that the organization structures in some of the plants do not facilitate quick decision making leading to delays in executions. In view of this, it is suggested that the organization structure of Biomass power plants may be professionally designed in order to facilitate effective decision making and exercise of control on procurement of raw materials and efficient operation of the plant. Keeping the above in mind, an organization structure modeled on a functional type organization was suggested to overcome the deficiencies in the existing organization structures of Biomass power plants.

2. Presently, the production of power from biomass is being done by burning the biomass directly in the boilers as in thermal power production process. In advanced countries, however, the biomass power is produced through latest processes like: co combustion, gasification, anaerobic decomposition and pyrolysis. The main objective of exploring other technologies for power production process is to bring down the cost of the power generation. Hence, it is suggested that the government may also encourage the promoters to adopt the latest technologies in biomass power production so as to enable them to take advantage of improved process and, as a result, the reduction of the cost of power production from biomass.

3. Most of the biomass power plants are competing with other biomass usage industries such as paper mills, cogeneration power plants and food processing units in the market for procuring the daily requirement of biomass by paying increased prices,

which is making their operations more expensive. Hence, it is suggested that the biomass power plants may explore other avenues of generating raw material such as raising energy crops as per their requirements in barren/waste lands, setting up of rice mills, etc.

4. The State Electricity Regulatory Commission fixed the power tariff in two parts, viz., variable cost and fixed cost to the biomass developers who have got the long term power purchase agreement with them. Certain operating parameters like Specific Fuel Consumption (SFC): Gross Calorific Value (GCV); Station Heat Rate (SHR); Fuel Price; Auxiliary Consumption and fixed cost operating parameters like Project Cost, Plant Load Factor (PLF), Auxiliary Consumption, O&M Expenditure and Escalation, Debt Equity Ratio, Depreciation, and Interest on Term Loan are taken into consideration for finalizing the Tariff. Hence, it is suggested that biomass power developers may gain thorough knowledge of all the operating parameters to make the plant operations more efficient keeping in line with the parameters prescribed by the SERC.

5. Biomass fuel is the key input for operating the biomass power plants at profitable levels. For making the biomass fuel management more efficient, it is suggested that all Biomass power plants may strictly follow [a] Calendarization / yearly biomass fuel procurement plan [b] Supply chain [c] Making the required quantity available [d] Ensure the right type and quality of the fuel [e] Competition and Price management [f] Storage [g] Processing [h] Fuel Mix / Combinations and Feeding [j] Monitoring biomass fuel usage and accounting fuel losses.

6. To operate the biomass power plants effectively without any breakdowns, certain factors like boiler water, biomass fuel, grid fluctuation, etc., are to be closely monitored and managed. Biomass power plants can never be operated at a stretch for 365 days in a year. It requires monthly 1-2 days and yearly 20-30 days shut down for repairs and maintenance. The operative days will be only 310 days in a year. Hence, it is suggested to follow predictive/ preventive and opportunity maintenance to avoid

the unexpected breakdowns of the plant which are being normally managed by remedial/breakdown maintenance management. It is further suggested that the maintenance schedules like daily, fortnightly, monthly and yearly are to be strictly followed to keep up the life of the equipment.

7. The biomass power plants are facing shortage of skilled workers as technically qualified engineers are not showing interest to join the power plants as they are basically located at interior places or villages. Mostly, candidates with diploma or ITI qualification with 2-3 years of experience in operations and the local graduates are interested to join the biomass power plants. Hence, it is suggested that the required manpower may be recruited and trained in appropriate skills to keep up the machinery and better operations of the plants. Job responsibilities have to be clearly specified for all employees to enable them to perform well in the given job.

8. The managements of biomass power plants may establish strong reporting systems in the operations like management information system, daily log books at control room to monitor various equipments like Turbine, Boiler, RO Plant, Electrical installations, weigh-bridge, Fuel yard, etc. It is also suggested that the daily fuel procurement vouchers may be supported with photos taken at weigh-bridge, moisture analysis reports and fuel yard supervisor's certification of material at unloading point. Daily consumable registers are to be maintained by the store-in-charge for effective control mechanism. The respective team leaders need to organize fortnightly, monthly and yearly meetings to enable the team members to implement the plans and achieve the objectives. The minutes are to be recorded properly and if there any deviations, the required corrective actions are to be taken on time. The daily production data like power generation, export and auxiliary consumption with the detailed performance parameters like SFC, Fuel average cost, total fuel cost, administrative expenses and finance charges need to be monitored and recorded by the management staff. Based on the performance appraisals of all the employees, the yearly increments, bonus and promotions are to be announced. The statutory requirements of various government

departments have to be complied with from time to time. This process of controls will help the management to achieve the desired results.

9. The biomass power plants have entered into 20-year long power purchase agreements (PPAs) with APTRANSCO and third party sale of biomass power is not allowed. This is preventing Biomass power plants from absorbing the additional increase in the fuel prices, etc. Hence, it is suggested that the government may favorably consider allowing Biomass power plants the option of third party sale of biomass power at least to the extent of 20 – 25 per cent of the power generated by Biomass power plants which will greatly help the plants to achieve viability of their operations.

10. The pricing policy of the government decides the survival of the biomass power plants. The government policies need to give timely solutions to the developers on issues like tariff dispute, etc., to avoid litigation in courts. To expedite the government machinery for fixation of tariff it is suggested that the state ERC may consider sending their technical members to the biomass power plants to collect the correct readings according to the revised parameters like: SFC, GCV Station Heat Rate (SHR) which will greatly help in expediting tariff fixation.

11. Another disadvantage that the biomass industry suffers from is the fixation of the plant load factor (PLF). As per the prescribed norms, 10 per cent of the power produced is to be utilized by the plant itself as auxiliary consumption. The government is allowing only 80 per cent of the PLF out of the remaining 90 per cent installed capacity. If the plant produces between 80-100 per cent, the government is paying only variable cost and not the fixed costs but providing a nominal 50 paisa per unit as incentive which is insufficient. The unrecovered cost of the power produced by the plants between 80-100 per cent is discouraging them not to produce power to the fullest capacity. Hence, it is suggested that the government may consider payment of the full tariff (both fixed and variable costs) based on the net exportable units of power up to their licensed capacity so that the plants are encouraged to produce power to the full licensed capacity.

12. The biomass power plants are facing problems that arise from feedstock supply whose availability all through the year is uncertain. Feedstock is agro-based and so is available in harvesting seasons only. This raw material has to be procured during short spells and stored for the whole year. This is causing degradation of the quality of raw material. Hence, it is suggested that the government may favorably consider issue of coal permits to biomass power plants without linking them to the 'priority power sector' which will help timely delivery of coal to Biomass power plants to ensure economical operation of the plant during shortage of raw material in rainy season.

13. The study suggests the Biomass power industry that strategic management is an essential function which has to be devoutly pursued by the top management of each plant and this calls for professionalism and future-oriented mindset and cannot be delegated or willed out. The study has brought out some issues for the consideration of the promoters and the chief executives of Biomass power plants. The study revealed that strategic management practices need to be adopted to achieve three critical strategic objectives. They are: (a) securing control over operations, (2) reducing uncertainty and (3) measuring of results. A popular dictum says that what is not measured is not done; performance has to be measured if one wants it to happen. More importantly, external environment, particularly that relating to highly volatile technology and culture changes unpredictably, and so throws up a plant into uncertainty. It is, therefore, suggested that all Biomass power plants need to adopt strategic management practices to effectively operate their plants.

14. This study indicates that competition is always on the prowl and poised to attack from different sources; a plant has to be alert to these forces, particularly the current players and new entrants whose moves are unpredictable. Similarly, suppliers can turn into promoters which can hit a blow that has deleterious consequences. So, competitors' moves have to be monitored. Equally disturbing are the supplier trends. One should be careful about how the suppliers behave. Brazenly and ruthlessly, they

divert supplies to other more remunerative buyers. It is, therefore, suggested that the Biomass power plants should have captive suppliers or build its own raw material resources that gives a dependable supply. Equally important is the area of industrial relations. Relations with employees should be cordial. Else, the production will be subjected to irrecoverable shocks, according to this study.

15. This study indicates that it is incumbent on the plants to identify their core competencies, understand critical success factors, and analyze the past performance. The plant should identify its core competencies, which are unique to it, so as to leverage them in all its operations; similarly, it should study and understand the critical success factors of the industry. The common thread that passes through all the successful plants is the critical success factors. A plant has to diligently and devoutly work to build and leverage these critical success factors. The study also found that analysis of past performance is important to throw light on strengths, weakness, achievements and performance shortages. It is a direction-setting exercise and a guide to further action. Past data has a lot to say and one has to dig into it to get insights, according to this study. Past performance can also enlighten the promoters about opportunities and threats. It is therefore suggested that all Biomass power plants may periodically analyze their core competencies, critical success factors and past performance so that corrective actions can be initiated on time.

16. Formulating vision, determining mission and setting long-term and short-term objectives are essential to the success of a Biomass power plant. Vision and mission show the path in a clear light. Otherwise, the plant will grope in the darkness and their responses to external stimuli are just knee-jerk responses. Similarly, monitoring technological trends is of paramount importance to the industry, as the study reveals. Hence, it is suggested that all Biomass power plants may formulate a clear vision, mission and objectives to enable their successful operation.

17. Analysis of operations and also the different functions of the plant separately gives innumerable insights about the direction in which the plant is moving. Procurement of

raw material and costs of production are two important operations that demand a lot of attention from the management, according to this study. As revealed in the study, cutting of costs should be diligently pursued. That apart, analysis of Finance function is of highest importance to keep control on costs, profitability, adequacy of working capital, and return on investment, and also HR functions like training and development, motivating the employees, and ensuring a proper inventory of talent to meet the skill –related challenges. It is suggested that functional strategies of Finance and HR need to be given an added thrust by the Biomass power plants.

18. It is clear from the present study that the Biomass power plant should employ planning tools like SWOT, Cost Benefit Analysis, Value Chain Analysis, Strategic Advantage Profile, Key Factor Rating, and Benchmarking. Value can be created with deeper analysis with the help of these tools. Further, a plant should not be blind to its own strengths and weaknesses; leveraging the strengths and building defense against weaknesses is the mantra of success. Importantly, best practices adopted elsewhere should be swiftly emulated and taken advantage of. Similarly, certain activities like operations, inward logistics, preventive maintenance, etc. have the potential to reduce costs and, for this purpose, these activities need to be identified, understood and devoutly improved.

19. Quality of the people and their engagement with the mission of the plant makes a lot of difference and is the key to the success of the plant. It is needless to say that involvement of people at different levels at various activities of both strategic and tactical importance is of paramount importance since such involved people are clear about what they should aim at and what is expected of them. Involved people take responsibilities seriously and their commitment levels will be very high. It is therefore suggested that employees of the plant at various levels may be involved in the strategic management process through some mechanism to help secure their commitment for effective implementation of strategies.

20. It is suggested that effective reward systems for the workforce at all levels may be designed and pursued diligently. This will ensure employee commitment and engagement. This will be a strong factor that ensures that employees stick to the plant no matter what the temptation for them to join other organization.

21. Last but not the least is the evaluation and control of the strategies made and implemented. Strategies once made are not relevant forever and they require re-evaluation or recasting. It is therefore suggested that strategies being adopted by Biomass power plants need to be evaluated for their effectiveness and newer strategies put in place.

7.4 CONCLUSION

Biomass-based power production, which uses greener and sustainable material which provides social, economical and environmental benefits to the community, particularly where substantial agricultural wastes like paddy husk, top ends of sugarcane stalks, cotton plant stocks, etc., are available. It is quite heartening to note that the material whose disposal entails costs before the advent of biomass power industry is a source of substantial revenue for the farmers. Moreover, India, having a lot of arable land and its economy greatly depending on agriculture, has the potential to produce 16000 MW of power which constitutes a sizable proportion of power requirements of India.

The need for biomass power is compulsive and on the other hand enough raw materials are abundantly available. But the only fly in the ointment is government policies. The areas where positive attention of the government is needed range from the incentives that go with setting up of the industry to reasonable tariffs for the power produced. India at present turns out 500 million tons of biomass per annum. Biomass provides more than 30 per cent of the country's energy needs. Notably, due to technological advances in energy conversion, now a variety of biomass feedstock is available, due to which the industry has a wider choice of raw material on one hand and the better opportunities for farmers on the other. Biomass power generation in India attracts investments of over Rs.600

crores per annum, producing more than 5000 million units of electricity and yearly employment of more than 10 million man-days in the rural areas.

Biomass power is a solution to many ills like over-dependence on imported fuels, pollution etc. Since this industry uses agricultural waste and thus benefits the farmers, villagers and other stakeholders, a thorough study of the industry is absolutely important. Guided by this idea, the study attempted to understand the strategic management practices prevailing in Biomass power plants. It is also important that grid quality power has to come out from the plants, which is possible only with professional management.

The dominant motivating factors for adoption of Strategic Management Practices were 'the facilitation of control', 'uncertainty reduction', and 'measurement facilitation'. While (a) Vision and Mission, (b) Objective Setting, (c) Studying Technological Trends, (d) Analysis of Competitors, (e) Analysis of Supplier Trends, (f) Analysis of Customer Preferences, (8) Analysis of Industrial Relations was shown as elements of "Very Strong Emphasis', the other different elements of external analysis were not given this much emphasis.

The analysis has attempted to quantify the relationship of the independent variables to the plants' success. A regression analysis was done with plants' success as dependent variable and external environmental analysis, internal environmental analysis, strategy formulation, use of planning tools, involvement of people, strategy implementation, and strategic orientation. Strategy formulation and use of planning tools are the most important strategic management practices that greatly impact the plants' success as proven by the research study. Biomass industry is serving the farming community by purchasing their wastes. The plants in the sample spend considerable amount on agricultural wastes every year. This research also tried to understand which raw material is consumed most by the power plants and what the other agricultural wastes.

It is quite disturbing to note that the quantum of funds the Biomass power plants incur on raw material is showing a downward trend indicating that the plants are not operated to

their full capacity in the recent years. From social standpoint, however, the Biomass plants are doing yeomen's service to the farmers since they purchase their residues and increase their farm revenues or at least reduce the farming costs.

This study helps the ongoing debate on strategic management practices of small business enterprises. The results of the present study indicate that Biomass power plants which followed strategic management practices had shown significant improvements in performance.

The results of the present study also indicate that there are significant differences among the respondents on the approach to strategic management process. This lends further support to the premise that it is the "process" of planning not merely the "plan", which is important in evaluating the outcomes of strategic management. Intensive interaction with promoters and experts of Biomass power plants confirmed the premise that strategic management offers other tangible benefits, such as enhanced awareness of external threats, an improved understanding of competitors' strategies, increased employee productivity and a clearer understanding of performance-reward relationships.

In addition, the study suggested that the principal benefit of strategic management has been to help organizations formulate better strategies through the use of more systematic, logical, and rational approach to strategic choice. Through involvement in the process, managers became committed to supporting the organization because the process provides them an opportunity to be informed about the business objectives, the direction of the business, the progress towards achieving objectives, and its customers, competitors, etc.
As emphasized by the experts about the importance of involving all employees in the strategic management process, the study also identified that non-involvement of employees is a possible barrier to strategic management. The researcher strongly feels that non-involvement of workers in the process may alienate them in the long run, and make them less committed to the vision, mission and strategies of the organization. Therefore, the Biomass power plants may have to find some way of involving the

workers, even on a selective basis in the strategic management process which will have its own advantages.

7.5 SCOPE FOR FURTHER RESEARCH

The study that has been done now is limited to the state of Andhra Pradesh only. The same study may be extended to other States also where biomass power industry exists so as to establish a uniform policy to further strengthen the biomass industry to utilize the potential capacity to the optimum level. There is also a need to understand, for further research, why agricultural dominant states where staggering amounts of biomass is available, are lagging behind in utilizing the agricultural residue for utilizing the potential capacity. The Government of India may commission a research study to throw light on the foregoing. Although a lot of agricultural wastes are available in certain agricultural states like Punjab, the potential for biomass power has not been fully utilized. For example, Punjab has the potential to produce 2413 MWe from biomass; it currently has an installed capacity of 74.5 MWe. The same is the case with Haryana and Rajasthan states too. In states like Madhya Pradesh and Kerala, they did even start one Biomass power plant.

Future research should focus on understanding the link of vision, mission and objectives and other innovative and strategic management practices to the outcome variables like organizational productivity, brand equity, employee morale and organizational citizenship behavior. The other questions that require answers include lukewarm support from the Government whose support is inadequate and unpredictable. The Government may understand the weaknesses of the industry, which is possible with a proper research only.

There is wide scope for further research in areas such as formulation of vision and mission statements, corporate internal assessment, the mechanisms of evaluation and control, etc., which form part of strategic management process. Studying the relationship between formal and informal modes of strategic management and strategic choice within

different industries would be an extension of this study. The results of this study are based on only one in-depth case study in the manufacturing sector, thereby limiting the application of results to other sectors, such as service sector, banking sector, insurance sector, etc., Studying the strategic management process and strategies adopted in various sectors of the economy can be a further area of research which can contribute substantially to the body of knowledge in the field of strategic management. There is scope for further research in the area of functional strategies adopted by various Biomass power plants in the country, in order to get a comparative picture of their formulation and implementation as well as the impact on the performance of the Biomass power plant concerned.

This study could not address the implementation issues, such as allocation of resources, strategy – structure relationship, building strategy supportive culture, strategic leadership, management information systems, (MIS), reward systems, etc. It is suggested that the future research on these elements would contribute substantially to the strategic management literature.

The most serious problem confronting the Biomass power plants today is shortage of raw materials. Every Biomass power plant has to formulate its own strategies to ensure uninterrupted supplies of raw material. The nature and the components of such strategies and the modalities to be adopted for their formulation and implementation, is another interesting area for further research.

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